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STATE PLANNING COMMISSION OF THE U.S.S.R.

THE SECOND FIVE-YEAR PLAN

FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R. (1933-1937)

WITH A FOREWORD
"FULFILMENT OF THE SECOND FIVE-YEAR PLAN DURING 1933-35"
BY V. I. MEZHLAUK
Chairman of the State Planning Commission of the U.S.S.R.

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FOREWORD

Fulfilment of the Second Five-Year Plan During 1933-35

By V. I. MEZHLAUK

FULFILMENT OF THE SECOND FIVE-YEAR PLAN DURING 1933-35

(Foreword to the English Edition of "The Second Five-Year Plan")

THE Second Five-Year Plan for the Development of the National Economy of the U.S.S.R., which embraces the period from January 1, 1933 to December 31, 1937, provides for the accomplishment of the following chief tasks: 1) the building of classless, socialist society; 2) the completion of technical reconstruction throughout the whole of national economy; 3) a still more rapid improvement in the standard of material well-being and culture of the entire Soviet population, a 2 to 3-fold increase in per capita consumption.

The three years that have elapsed since the beginning of the Second Five-Year Plan period (1933-35) have furnished sufficient material by which to estimate the degree of fulfilment of the chief social as well as production and construction tasks set by the Second Five-Year Plan.

1. The Building of Classless, Socialist Society

The building of classless, socialist society is the main goal of the Great Proletarian Revolution, the principal objective of the vast creative work that has been going on in the Soviet Union in the course of the past eighteen years. In the Soviet Union, where industry, transportation, the land, the banks and foreign trade belong to the State, the period of time necessary for the construction of classless, socialist society has depended primarily upon the development of a powerful, advanced, large-scale machine industry, above all heavy industry, upon the time required to bring about the conditions essential for switching the 25,000,000 small peasant farms to the track of socialized economy.

The consolidation of the key positions in the hands of the State, the persistent and intensive work done to introduce co-operative forms of economy into agriculture—from the most elementary

forms of co-operation (consumers' co-operative organizations) to the co-operation of various branches of peasant production, the policy of restricting and forcing out the kulaks (rich peasants) which has been pursued unswervingly—all these co-ordinated measures carried out for a number of years have ensured the successful realization of the collectivization of agriculture. Beginning with 1929, a powerful movement in favour of collective farms developed in the country, and by the end of the First Five-Year Plan period, in 1932, 61.5 per cent of all peasant households had joined collective farms. During the period of the First Five-Year Plan, the country established its own heavy industry capable of re-equipping all branches of national economy, including agriculture.

Collectivization, which during the years of the First Five-Year Plan period already embraced the bulk of peasant farms, could not have been achieved without the abolition of the kulaks as a class, inasmuch as the kulaks were its most bitter, most desperate enemies who stopped at nothing in their fight against this movement. The victory of the collective-farm system in the countryside at the same time meant putting an end to the conditions which engender elements of capitalism, meant doing away with the exploitation of man by man throughout the Land of the Soviets, since in the cities all means of production had already been socialized. During these years private trade, the domain in which private capitalist elements formerly developed intense activity, was likewise abolished.

Owing to the defeat of the parasitic classes, the Soviet Union has become a country *where everybody works*, where the possibility of parasitic existence has been completely and finally eradicated. This constitutes one of the most important achievements of the Great Proletarian Revolution, and one of the most important characteristics of the new social-economic order established in the U.S.S.R.

Socialism has greatly strengthened its position both in town and country during the past three years of the Second Five-Year Plan period (1933-35). Industry has been developing apace; transportation has been making rapid progress; cadres of engineers, technicians and skilled workers have been formed, who are successfully mastering the new technique.

Even the most backward among the peasantry have become convinced of the superiority of the collective-farm system. At the

present time about 90 per cent, or more than 22,000,000 peasant farms out of the 25,000,000, have been collectivized, and in the most important grain districts 95 to 98 per cent of all households have joined collective farms. Individual farmers—the collective farmers of tomorrow—are daily becoming fewer in number, and there is no doubt that the task assigned by the Five-Year Plan—to complete collectivization by the end of 1937—will be accomplished.

At the same time the collective farms have grown much stronger. The ranks of the collective farmers have supplied hundreds of thousands of excellent managers (collective-farm chairmen, brigade leaders, group leaders) who are successfully coping with the management of highly mechanized, large-scale agriculture. The constant aid provided by the State in materials, money, as well as political, scientific and managerial instructions, and the growing experience and political consciousness of the collective farmers create all conditions necessary for the further development of socialist agriculture.

The Soviet Union at the present time is a socially monolithic country where, as Stalin stated as far back as the beginning of 1934 at the Seventeenth Congress of the Communist Party of the Soviet Union, "the socialist system now has unchallenged predominance and is the sole commanding force in the whole of national economy." This may be clearly seen from the following figures showing the proportionate growth of socialist forms of economy in the national income:

	1932	1933	1934	1935
National Income (in billion rubles) . .	45.5	48.5	55.8	65.7
Proportion of socialist forms of economy (in per cent)	93.0	95.0	96.0	97.8

This predominance of socialist forms of economy signifies that the means of production are no longer owned by individuals but have become socialist property, *i.e.*, the property of socialist society. At the beginning of 1935, 95.81 per cent of the total fixed capital were already in the socialist sector and only 4.1 per cent were in the hands of small private property owners, while an absolutely insignificant fraction—0.09 per cent—was owned by the remnants of the capitalist elements.

The profound transformation of the economic system and the change in the social structure of the Soviet Union were bound to find their expression in the fundamental laws of the Soviet Union.

The victory of socialism reduced the number of those deprived of electoral rights, the formerly exploiting minority, to an insignificant fraction. The revolution destroyed the bourgeoisie and landlord class, and with the abolition of the last capitalist class, the kulaks, the number of disfranchised persons at the end of 1934 constituted only 2.5 per cent of the adult population of the country. This is incomparably less than the percentage of people disqualified, by means of various discriminatory measures and restrictions, from taking part in elections under any existing system of capitalist democracy.

The Seventh All-Union Congress of Soviets, which took place at the beginning of 1935, decided to amend the Constitution of the U.S.S.R. by further democratizing the electoral system—to replace not entirely equal suffrage by equal suffrage, indirect elections by direct elections, and the open ballot by the secret ballot. These changes signified that the Soviet Constitution is being brought in line with the present social structure of the U.S.S.R. (the creation of a new, socialist industry, the defeat of the kulaks, the victory of the collective-farm system, the establishment of socialist property as the basis of Soviet society). "We are advancing toward the complete abolition of all the restrictions on elections to the Soviets which were at one time introduced 'as temporary measures to fight any attempt of the exploiters to defend or restore their privileges,' as the Program of the Communist Party of the Soviet Union states. These facts bear out the oft-repeated statement of Lenin that the limitations of universal suffrage introduced in our country are of only a temporary nature." (Molotov.)

The reshaping of social relations in the Soviet countryside found striking expression at the Second Congress of Collective-Farm Shock Workers which took place in February 1935. The Congress itself was a living confirmation of the words of Stalin: "One of the most remarkable gains of the collective-farm movement consists in the fact that it has already managed to bring to the fore thousands of organizers and tens of thousands of agitators in favour of collective farming from among the peasants themselves." By the terms of the Model Rules for agricultural artels, adopted by the Congress on the initiative of Stalin and known as the Stalin Model Rules, the land occupied by a collective farm—the socialist basis of collective-farm production—is being secured to it in perpetuity.

As a result of the rapid progress made in the economic life of

the country and of the changes in the social composition of the population, a new social consciousness is being formed, the survivals of capitalist mentality are being outlived and a new, socialist attitude toward work is being developed. The progress made in this sphere between 1933 and 1935 is immeasurable. The profound revolution in the minds of people, in their attitude toward work, has received powerful expression in the movement which in the autumn of 1935 sprang from the ranks of the workers and produced exceptional results in raising labour productivity—the Stakhanov movement.

A plain miner, the Donetz Basin hewer, Alexei Stakhanov, in response to Stalin's speech of May 4, 1935, the keynote of which was care for the human being and which marked a new stage in the development of the U.S.S.R., proposed a new system of labour organization for the extraction of coal. The very first day his method was applied he cut 102 tons of coal in one shift of six hours instead of the established rate of 7 tons. In a few days he doubled his own record.

Within a few weeks this movement to exceed the established rates of output, to increase the productivity of labour, had taken hold of the workers in the most varied trades and enterprises. Steel smelters, metal rollers, weavers, pneumatic pick-hammer operators, locomotive engineers, firemen, mechanics, turners and lathe operators began to revise their methods of work, to organize their production processes more rationally and to exceed all established rates of output. At a number of enterprises world records were scored. Thus Dyukanov, a Communist, one of the initiators of the Stakhanov movement, using an automatic pick hammer, cut 133 tons of coal in one shift, which record Borissov, using an electric drill, later raised in Prokopyevsk to 778 tons. Bussygin, a blacksmith of the Gorky Automobile Plant, made 157 crankshafts an hour, while the American rate of output is 100. Smetanin, a worker of the Leningrad factory "Skorokhod," handles 1,860 pairs of shoes a shift, surpassing the standard of the Bata factory in Czechoslovakia where the rate is 1,125 pairs. At the Yenakiev Steel Mill a number of workers scored new records in steel smelting—13, 16, and even 20 tons per sq. metre of open-hearth furnace area.

"The significance of the Stakhanov movement consists in the fact that it is a movement which is smashing the old standards of output because they are inadequate, which in a number of cases is surpassing the productivity of labour of the foremost capitalist

countries and is thus creating the practical possibility of further consolidating socialism in our country, the possibility of converting our country into the most prosperous of all." (Stalin.)

The Stakhanov movement is based on the achievements of the First and Second Five-Year Plans: it was prepared for by the technical re-equipment of national economy brought about by the growth of heavy industry; it was prepared for by the socialist reconstruction of agriculture, the abolition of the last capitalist class, the kulaks; it was prepared for by socialist competition, by a new, socialist attitude toward work, by the transformation of labour "from a disgraceful and painful burden," as it necessarily is in capitalist countries, into "a matter of honour, glory and heroism"; it was prepared for by a radical improvement in the condition of the working population, by a rise of the cultural level and the growth of technical knowledge of the workers.

The Stakhanov movement is a new and higher stage in socialist competition.

The Plenum of the Central Committee of the Communist Party of the Soviet Union, held in December 1935, pointed to the following features as summarizing the essence of the Stakhanov movement: the organization of labour in a new way, rationalization of technological processes, proper division of labour, exemption of skilled workers from preliminary work of secondary importance, better organization of the work place, rapid growth of labour productivity and a considerable increase in wages for workers and employees.

Resulting as it does from the victory of socialism in the U.S.S.R., the Stakhanov movement opens up "the practical possibility of the further consolidation of socialism," of a still more rapid increase in production, particularly articles of consumption, and of a constantly increasing well-being of the whole working population.

Stakhanov workers are workers who have mastered technique, who have smashed the established technical standards of output and get the utmost out of the machinery they operate; they are plain workers who, however, are able to supplement and correct the work of engineers and scientists. Stakhanov workers approach their work like real masters of the country who feel their responsibility to the whole people, who practice genuine socialist labour discipline. Stakhanov workers are workers who not only know how to turn out high-grade products but also how to organ-

ize work, to rationalize it and direct it along new lines. Stakhanov workers are workers who not only know how to plan their own work and the work of their brigades but who, thanks to the unprecedented productivity of their labour, make changes necessary in the plans of whole enterprises, branches of industry and even in the entire plan of national economy. A number of factories, mines and railroads, which for a long time failed to fulfil their plans, have begun regularly to overfulfil them. The Stakhanov movement has revealed vast latent potentialities of production, has demonstrated the possibility of materially increasing production without new capital investments.

The powerful Stakhanov movement in industry and transportation finds its counterpart in the radical change that has occurred in the minds of the collective-farm peasantry. The very act of joining a collective farm, of abandoning the age-old forms of individual husbandry, was the reflection of a most profound revolution in the minds of the peasant masses.

The fact that the peasants are now discharging all their obligations to the State in full and in advance of schedule is striking evidence of the radical change in their mentality. For several years deliveries to the State of grain and of industrial crops have been completed before the time specified, but never yet at so early a date as in 1935.

The third year of the Second Five-Year Plan period is notable not only for its high harvest in a number of crops—grain, cotton, sugar beet—but also for excellent records of labour productivity in agriculture. In the sugar-beet collective farms, a movement known as that of the "five-hundreders," initiated by Maria Demchenko, a young Ukrainian collective-farm girl, has become widespread. While in 1935 the average yield per hectare was 130 to 132 centners, these collective-farm girls harvested 500 centners and over. This movement of the "five-hundreders" has already made it possible to set the planned task for 1936 at 204 centners of sugar beets per hectare.

The rise and rapid spread of the Stakhanov movement not only in the towns but also in the countryside in a sense sums up all the successes achieved in the fulfilment of the Second Five-Year Plan during 1933-35. This movement which sprang spontaneously from the masses was made possible by the radical improvement in the material conditions of the working people; it is the result of the introduction of modern machinery and of the mastery of this

machinery. It results from the formation of new forces of workers and collective farmers who have a new attitude toward work, who fight for the fulfilment of production plans as for their own personal cause.

The Stakhanov movement could arise only in a society in which there is no exploitation. Being the product of new, socialist conditions, it ensures a tremendous increase in the labour productivity of Soviet industry, transportation and agriculture. This makes it possible to fulfil the Second Five-Year Plan in several branches of industry during a shorter period of time than was originally planned.

II. Completion of the Technical Reconstruction of National Economy

The completion of technical reconstruction in the whole of national economy, which is the chief economic task of the Second Five-Year Plan, involves a vast construction program. During the period of the Second Five-Year Plan, construction is being developed on a scale far exceeding that of the First Five-Year Plan period when more than 1,500 huge industrial enterprises were built, many of which cannot be matched in Europe, as, for instance, the Dnieper Hydro-Electric Station, the Magnitogorsk and Kuznetsk Iron and Steel Works, the Stalingrad and Kharkov Tractor Plants, etc.

During 1933-35 the value of construction amounted to 64,600,000,000 rubles as against 50,500,000,000 rubles during the whole of the First Five-Year Plan period. This capital invested during three years included the following major items: industry, 33,500,000,000 rubles, of which 27,700,000,000 rubles in industry producing means of production and 5,800,000,000 rubles in industry producing articles of consumption; agriculture, 6,700,000,000 rubles; transportation and communication, 13,300,000,000 rubles. Still more striking are the figures showing the volume of completed construction: the total value of enterprises put in operation during these three years amounted to 58,600,000,000 rubles, as against 38,600,000,000 rubles representing the value of enterprises put into operation during the entire period of the First Five-Year Plan.

The value of the fixed capital of the whole of national economy increased in 1933-35 (in fixed prices of 1933) from 49,400,000,000

rubles in 1928 and 85,200,000,000 in 1932 to 140,600,000,000 rubles at the end of 1935. Almost 40 per cent of the fixed capital were renewed during the first three years of the second five-year period. The magnitude of this rate of increase in renewal is emphasized by the fact that according to the Five-Year Plan the fixed capital in national economy is to be renewed 50 to 60 per cent during all the five years.

In some of the principal branches of production, this renewal was as follows:

Branches of production	Total means of production as of Jan. 1, 1933	Output for first 3 years of 5-year period	Output for first 3 years of 5-year period, in % of total stock as of Jan. 1, 1936
Metal-cutting machine-tools (in thousands) . .	169.0[1]	63.0	27
Freight locomotives (in "E" type equivalents)	12,100	3,205	20.9
Automobiles (in thousands)	75.4	218.9	74.4
Tractors for agriculture (in thousand h.p.) . .	2,225	4,682	67.8
Harvester-combines (in thousand actual units)	15.5	37.1	70.5

[1] As of April 1, 1932.

The total means of production as of January 1, 1936 are calculated without including imports or allowing for depreciation. If these factors are taken into account, the percentage of renewal will be still greater.

The renewal of equipment in the iron and steel industry appears from the following data:

	1932	1935	1935 in % of 1932
Useful volume of blast furnaces (in thousand m^3)	20,029	51,180	258.6
Hearth area of open-hearth furnaces (in thous'd m^2)	6,767	9,790	144.7

The technical re-equipment of national economy is accomplished by introducing most up-to-date machinery, and therefore the technical level of the renewal, which finds its reflection in production capacity, is considerably higher than can be expressed in the value indices of the renewal.

1. *Industry*

As under the First Five-Year Plan so during the first three years of the Second Five-Year Plan period, industrial output showed a high rate of increase. However, the fact that during the

Second Five-Year Plan period the production in the numerous new enterprises completed during the First Five-Year Plan period had to be mastered at one and the same time resulted in great difficulties. For this reason during the first years of the Second Five-Year Plan period, industrial output, though exceeding in absolute figures the ouput of the preceding years, showed lower rates of growth. As anticipated by the Second Five-Year Plan itself, the output of all industry rose in 1933 by 6.2 per cent, but already in 1934, when these difficulties had been surmounted, the output of industry rose by 18.7 per cent and in 1935 by 20.7 per cent. The value of the entire industrial production (in fixed 1926-27 prices) was 65,900,000,000 rubles in 1935, 22,600,000,000 rubles in excess of the corresponding value in 1932, the last year of the First Five-Year Plan period.

The rates of increase in the most important branches of industry and the extent of plan fulfilment during the first three years of the second five-year period can be judged by the following data:

Branches of industry	Units of measurement	1913	1928	1932	1935		
					Five-Year Plan's quota	Actual fulfilment	Percentage of fulfilment
Gross output of large-scale industry	bill. rbls. (1926-27 prices)	10.25[1]	16.9	38.5	59.6	61.9	103.8
Metal-working industry	"	1.1	2.1	9.4	14.6	17.0	116.4
Electricity	bill. kwh.	1.9	5.0	13.5	24.0	25.9	108
Coal	mill. tons	29.1	35.5[2]	64.4	110.0	108.9	97
of which:							
Donetz Basin	"	25.3	27.3[2]	44.8	66.7	67.3	100.8
Pig iron	"	4.2	3.3[2]	6.2	12.2	12.49	102.4
Steel	"	4.2	4.3[2]	5.9	12.1	12.5	103.5
Rolled steel	"	3.5	3.4[2]	4.3	8.0	9.4	112.5
Chemical industry	mill. rbls,	no data	no data	1.49	2.5	3.57	142.8
Meat	thous. tons	no data	no data	435	600	565	94.1
Fish	"	no data	870.0	1,333	1,550	1,540	99

The higher rates of increase in output during 1934-35 make it possible to fulfil the tasks assigned for 1937 ahead of schedule in several branches of national economy and in various districts. In 1935 the output of harvester-combines had already exceeded the

[1] Exclusive of the timber cutting and the fish industry.
[2] 1927-28.

figure set for 1937. The Krivoy Rog Basin, the principal iron-ore district, fulfilled its five-year plan in three years. There is every prospect of fulfilling in four years the five-year plan for coal extraction in the Donetz Basin, for the manufacture of agricultural machinery, for plastic masses, synthetic rubber, sulphur production, the varnish and dye industry, the output of rare metals, and for pig iron, steel and rolled products in some of the biggest iron and steel works. The Stakhanov movement, though only in its initial stage, has already proved to be a vital factor in accelerating the fulfilment of the Second Five-Year Plan.

As a result of the successful fulfilment of the Second Five-Year Plan during the past three years, the Soviet Union is surpassing one country after another in output of all the most important branches of industry. In 1935 the Soviet Union occupied second place in Europe[1] in generation of electricity, third place in coal mining, first place in oil and peat extraction and copper smelting, second place in production of superphosphate, steels, etc. The Soviet Union, which but recently satisfied its requirements in special steels, aluminium, machine-tools, tractors, combines, automobiles, etc., almost entirely by imports, has now taken first place in Europe in the manufacture of machine-tools, motor trucks and high-grade steel, and second place in the manufacture of aluminium. Moreover it now occupies first place in the world in the manufacture of tractors, railroad freight cars and locomotives. Seventy-five to eighty per cent of the world's tractor and combine production are now concentrated in the U.S.S.R.

The technical reconstruction of industry is being carried out along the following main lines: 1) maximum degree of electrification; 2) mechanization of all laborious processes; 3) mastery of the most modern technological processes; 4) manufacture of all necessary metals, chemicals and equipment.

During the first three years of the Second Five-Year Plan period the capacity of electric power stations rose by 2,200,000 kw., 1,520,000 kw. being accounted for by regional stations. (The Plan for the generation of electricity has been overfulfilled.) Scores of stations have been built or are under construction; the construction of the Volga stations, which will be the basis for the biggest power system in the world, has been started. While electricity generation shows rapid rates of increase as a whole, output is growing most

[1] The output in 1935 is taken as the basis of comparison also for the capitalist countries.

rapidly in hydro-electric power stations, as a result of which the share of the regional hydro-electric stations in the total output of the regional power stations increased from 7.5 per cent to 16.5 per cent. Considerable progress has also been made in heat-and-power development. In 1935, 15.5 trillion British Thermal Units were generated as against 7.2 trillion B.T.U. in 1932. The Soviet Union's electric power stations have the most modern equipment. Suffice it to state that 71.5 per cent of all steam turbines and 57 per cent of all boilers have been installed during the last five years.

As a result of the progress made in electrification the electric power supply available per worker has risen, now constituting 3,440 kwh., while in Germany in 1930 it constituted 2,910 kwh.

In 1934 the coefficient of electrification in industry was as high as 78.9 per cent. A number of new branches of industry have been established—the electro-metallurgical industry, electro-chemical industry, etc.

The machinery industry has learnt to produce many new types of equipment. As a result great strides have been made during the first years of the Second Five-Year Plan period in the mechanization of laborious processes and the replacement of arduous hand-labour by machinery.

This process is graphically illustrated in the following table:

Mechanization of Laborious Processes in the Principal Branches of Industry

(In per cent of total)

Classification	1932	1935
Mechanized coal extraction	65.4	78.2
Mechanized gathering of coal	76.5	78.2
Mechanized peat cutting under Chief Peat Board of People's Commissariat of Heavy Industry	49.7	71.1
Mechanized pouring of pig iron	43.6	75.0
Pig iron smelted in completely mechanized departments	25.6	53.5
Mechanized timber hauling under People's Commissariat of Timber	4.4	26.4

Some of these figures come very near or even exceed the level specified by the Five-Year Plan for 1937. Thus, the proportion of mechanized coal extraction for the Donetz Basin is to be 98 per cent in 1937; that of mechanized peat cutting, 71.7 per cent; of mechanized timber hauling, 28.3 per cent.

Because of the shortage of labour in the Soviet Union the task of replacing labour power by mechanical power in all laborious processes has become exceptionally urgent. With this aim in view,

the production program provides for the most rapid development of the manufacture of coal-cutting machines, pneumatic pick hammers, electric locomotives, mining combines, excavators, pouring machines, equipment to mechanize the charging of blast furnaces, etc.

In order to solve all these problems, to ensure the technical and economic independence of the country and increase its defensive strength, it was necessary to introduce new manufactures. Many pages could be filled by an enumeration of such manufactures mastered during the first three years of the Second Five-Year Plan period. The list below includes only a few of them.

The machinery industry has learnt to produce electric passenger locomotives having a speed of 130 km. per hour, type "VM" (Vyacheslav Molotov) Diesel locomotives, 8 and 12-axle flat cars, all-metal welded railroad passenger cars, subway cars, a number of special tank cars, caterpillar tractors with a capacity of 60 h.p. delivered to shaft, trolley-buses, Diesel tractors, 40-foot harvester-combines, large-size flax-pulling machines, 1-drum high-pressure boilers, welded drums for high-pressure boilers, turbines with a capacity of 50,000 kw., blast-furnace turbo-blowers, high-voltage equipment and high-power 110,000 to 220,000-volt transformers, 15,000-volt mercury rectifiers, 4,200 h.p. Diesel engines for ice-breakers, flax-spinning water frames invented by Engineer Zvorykin which double productivity per frame, wool ring-spindle spinning frames invented by Engineer Khrushchov, extra high-stretch twist and weft ring-spinning frames, automatic changing looms (cotton), special exhausters, electro-magnet equipment, super-centrifuges, spur-gear shapers, single and 4-spindle full automatic lathes, radio drilling machines, horizontal and vertical drilling machines, tool-room lathes, heavy machine-tools for railroad shops, mining combines, tabulating machines, rotary presses, paper-making machines, etc.

The output of the machinery industry in 1935 was 15 times as great as that of 1913.

In the iron and steel industry the manufacture of the following kinds of steel and tubing has been introduced: free-machining steel, cold-drawn bars, auto-body sheets, steel for ball-bearings and silchromal steel, full-finished sheets for discs, silico-manganese steel, stainless cold-rolled strip for aircraft, rotary-drill pipes, piping for ball-bearings, stainless steel pipes, chromo-molybdenum pipes.

In the manufacture of aluminium which was only commenced

in 1932 when the output was 900 tons, alumina produced in the Soviet Union is now being used. The manufacture of carbon and graphite electrodes has been mastered. With an output of 25,000 tons in 1935, the U.S.S.R. ranks second in Europe in the production of aluminium.

During the first three years of the Second Five-Year Plan period the Soviet Union has mastered the mass production of nickel, established the production of tin, and has sharply raised the output of zinc, lead, copper and a number of rare metals, as a result of which it gained in 1935 one of the foremost places in the world for the variety of non-ferrous and rare metals manufactured.

During these years the chemical industry has learnt to manufacture hundreds of new products, a number of dyes, chemico-pharmaceutical products, plastic materials, synthetic products (methanol, phenol, etc.). The U.S.S.R. was the first country in the world to begin the mass production of synthetic rubber, the mastery of which process represents a major victory. In 1935 it produced 25,000 tons of synthetic rubber, and owing to systematic improvement in the method of its production the amount of raw material consumed per ton of output was considerably reduced, quality was improved and production costs lowered. Thus, while in 1934, 12,000,000 deka-litres of alcohol were consumed in the production of 11,000 tons of rubber, in 1935 only 13,000,000 deka-litres were required to produce 25,000 tons of rubber.

The wood-chemical and paper industries have learnt to produce ethyl alcohol from wood pulp, compressed wood fibre, heat insulating material, butyl acetate, resin soap, perforated cardboard paper, Kraft paper bags, fibre tubing, veneered plywood, etc.

Heavy industry, established along modern lines during the First Five-Year Plan period, made it possible to develop the technical reconstruction of the timber industry, of light industry and of the food industry on a large scale during the Second Five-Year Plan period.

All these branches of industry, which but recently consisted of poorly equipped small-scale enterprises have now been transformed into large-scale machine-operated industries. Large meat-packing plants have been built in which hand labour has been completely eliminated; hundreds of entirely mechanized canneries, bread factories, vegetable-oil mills, dairies, etc., have sprung up. Besides reconstructing old enterprises, light industry has built big cotton and linen-goods combinations, knit-goods mills, shoe fac-

tories, plants producing artificial soles, cottonine, etc. In 1935 the timber industry of the People's Commissariat of Timber alone employed in timber hauling hundreds of steam locomotives and internal combustion locomotives, and thousands of powerful caterpillar tractors, traction automobiles, motor trucks, etc. Dozens of completely mechanized saw mills, wood-planing mills, furniture and paper factories, and a number of cellulose and wood-chemical mills have been erected. Several hundred enterprises were put into operation in the industries under the People's Commissariats of Light Industry, of Timber and of Food Industry during 1933-35, representing an aggregate value of over 4,500,000,000 rubles. To appreciate the significance of this figure it should be pointed out that during the years of the First Five-Year Plan the enterprises opened for exploitation in all branches of industry producing articles of consumption represented a total value of 2,500,000,000 rubles.

The mastery of the new technique required the formation of cadres of skilled workers, engineers and technicians capable of operating the new equipment efficiently. This was one of the main difficulties facing the country in the fulfilment of the Second Five-Year Plan. It may be safely asserted that the Soviet Union is coping successfully with the solution of this most difficult problem.

The numerous technical schools and courses, the keenness of millions of workers who were determined to master the new technological processes, and the zealous studies of these workers ensured an improvement in their skill. This made it possible to introduce the rule that only workers who have passed State technical examinations be admitted to certain lines of work. By November 1935, 800,000 workers in heavy industry had passed such examinations. Beginning with October 1, 1935, the workers of 160 of the principal trades in light industry took State examinations. At the same time the influx of new workers of the younger generation who had graduated from higher schools considerably raised the average cultural level of the working class.

During the first three years of the Second Five-Year Plan period, 64,700 new engineers and more than 124,300 technicians entered industry, thus effecting an improvement in technical management.

The progress made in the mastery of technique found its direct expression not only in increased production, but also in a marked

improvement of the qualitative indices: the indices of utilization of equipment, of consumption of raw material, quality of production, labour productivity and production costs.

The coefficient of utilization of the installed capacities of electric-power stations was 4,650 hours in 1935 as against 3,470 hours in 1932, and 3,047 hours in the U.S.A. and 2,187 hours in Germany in 1929. In point of fuel consumption per kwh. delivered at the bus bar, the U.S.S.R. has reached the low rates prevalent in Germany and the U.S.A. In the U.S.S.R. the amount of coal mined per cutting machine exceeds that of any other country. The coefficient of volumetric efficiency of blast furnaces was 1.22 in 1935, *i.e.*, better than specified in the Plan for 1937, as against 1.75 in 1932, coming close to the corresponding coefficients in the U.S.A. Within the next few years the quantity of steel smelted per sq. metre of furnace bed in the U.S.S.R. will undoubtedly be on a par with steel smelting in American and German works. The Stakhanov workers of the iron and steel industry have established a number of world records in the manufacture of steel and rolled products. Records have also been scored by the automobile and tractor industries. During a seven-hour shift the Stalingrad Tractor Plant produced 160 tractors instead of the 72 that constituted its projected capacity as set by American engineers. The Kharkov Tractor Plant turned out 150 tractors per shift instead of the 72 it had produced previously.

Particular attention is being paid to quality of output. The State has set industry the task of turning out high-quality products. The improvement in the material well-being of the working population has given rise to an especially great demand for high-quality consumers' goods. To achieve this, higher standards were introduced for raw materials used in the cotton goods, woollens, silk, shoe and other industries. The technological processes have been revised and particular attention is being paid to the high-grade finish of products. In this respect quite remarkable progress has been made, above all, by the food industry, which is now able to offer the Soviet consumer a great variety of high-quality goods. The government keeps constant check on this, approving specifications for merchandise in certain lines, determining proportions of output in other lines, as for instance, in the case of fresh fish, frozen fish, smoked and salt fish, the assortment of meat products, etc.

Considerable though inadequate progress has been made in this direction by light industry.

The Second Five-Year Plan period is a period of declining production costs. *In 1935 industry for the first time in a number of years completely fulfilled its plan for lowering production costs.*

The third year of the Second Five-Year Plan period was marked by a further increase in the productivity of labour. In 1933 labour productivity in large-scale industry rose 8.7 per cent in comparison with the preceding year; in 1934, 10.7 per cent and in 1935, 12.9 per cent, while in heavy industry the increase was 18 per cent.

The attention of the whole country is centred on increasing labour productivity. In the final analysis the superiority of any new social-economic system is shown in the level of its labour productivity. Knowing no crises, depressions, limitations to the growth of demand, nor anarchy of production, the Soviet Union's production apparatus works at full load, making better use of its equipment than any other country.

Thanks to the superiority of its new economic system, the Soviet Union has surpassed all countries of the world in rates of increase of output and of labour productivity, all European countries in degree of utilization of equipment, and sets itself the task of winning first place in the world also in the standard of labour productivity. The solution of this problem is necessarily attended by great difficulties. The starting point from which the Soviet Union began to surpass the other countries was that of a backward country, without long-established habits of work in large-scale machine industry and with a very low level of technical development. All the more striking therefore are the present achievements and unlimited prospects of increasing labour productivity that had been disclosed in connection with the Stakhanov movement.

To such an extent has the Stakhanov movement revolutionized all existing rates of output that it is by now quite clear that in 1936 the increase in labour productivity will be higher than ever before. In coal mining the Stakhanov workers are accomplishing five to six times the standard rate of output; in steel smelting, four to five times; in weaving, six times and over; in saw mills, three to four times, etc.

Finally, the successes achieved in the mastery of technique have found their expression in improved organization throughout the whole of national economy and in the establishment of a

normal production rhythm in thousands of huge enterprises, and have helped to overcome the seasonal character of production.

In the U.S.S.R. industry knows no fluctuations in production such as are called forth by crises, depressions and varying business conditions. None the less for a number of years there used to be a decline in production during the summer, extending as a rule over the months of July to September. This is explained by the fact that workers in certain industries used to leave for the farms at this time of the year, that large numbers of workers went on vacation simultaneously, that repair work was concentrated during these months, etc. In 1935 these things were done away with to a great extent and the level of industrial output rose with each successive month, with the exception of July when it slightly receded. Thus an even rise from month to month in the level of industrial production was ensured. At the present time a curve of development rising steadily from January to December has become the law of the dynamics of industrial production in the U.S.S.R. throughout the year.

The great material and financial reserves available have greatly facilitated the establishment of a normal production rhythm and improved organization in industry. The general upgrade movement in *all* branches of production and a marked improvement in the work of transportation have made it possible to set aside reserves of fuel and raw materials at the enterprises, thus ensuring their smooth operation.

2. *Agriculture*

The completion of technical reconstruction in national economy requires the introduction of mechanization and the latest scientific methods in farming. By establishing the largest-scale agriculture in the world, where the private ownership of land and of the principal means of production has been abolished and which works according to plan, all barriers to the removal of the traditional backwardness of agriculture, to the transformation of agricultural labour into a variety of industrial labour, have been cleared away. In the U.S.S.R. there are unlimited possibilities for the growth of agricultural production, and thus also for a well-to-do life on an increasing scale for the farming population.

The State machine and tractor stations, in which almost the entire fleet of tractors and combines, and the agricultural machinery tilling the fields of collective farmers are concentrated, are the

most important instrument for the mechanization of agriculture. During the first three years of the Second Five-Year Plan period, 1,904 new machine and tractor stations had been set up. The total number of these stations, which was 2,446 at the end of 1932, has risen to 4,350 at the end of 1935. During 1935 they served more than 72.8 per cent of the total collective-farm sown area. The machine and tractor stations are not only concentration points for high technique but also for the application of scientific farming methods, and are the economic and political bases of the State in the rural districts.

During the three years under review the tractor fleet of agriculture in the U.S.S.R. was increased from 2,225,000 h.p. as of January 1, 1933 to 6,543,000 h.p. (allowing for depreciation) by the end of 1935, which means a 20 per cent overfulfilment of the Five-Year Plan assignment for 1935. In 1935 alone agriculture was supplied with additional tractors having an aggregate capacity of 2,080,000 h.p. The U.S.S.R. has far surpassed all European countries in aggregate tractor power.

The large scale of the farms and the planned character of agriculture have made it possible to use tractors in the U.S.S.R. to better advantage than anywhere else in the world. The area worked per tractor, which is increasing from year to year, is one of the most important indications of the successful mastery of the new technique in agriculture. As a result of this, though the Soviet Union's tractor fleet possesses only half the power of that of the U.S.A., twice as much work in terms of ploughing was done in the U.S.S.R. in 1935 as in the U.S.A. in 1929. The composition of the tractor fleet has undergone considerable change as a result of the increase in the number of powerful caterpillar tractors manufactured by the Chelyabinsk Tractor Plant. So far 20,000 of these tractors have been supplied to agriculture during the Second Five-Year Plan period.

Great progress has been achieved in the mechanization of some of the most laborious processes of agriculture—harvesting and threshing. The quota of combines to be manufactured according to the assignment of the Five-Year Plan in 1937 was exceeded in 1935. The number produced was 20,200 as against 20,000 specified for 1937. At the end of 1935, the combine fleet was 52,500 strong and, due to better utilization, the area harvested by combines in the U.S.S.R. was equal to the area harvested by combines in 1930 in the U.S.A., where agriculture is more highly mechanized

than anywhere else in the world and the number of combines totals 61,000. The new plan for 1936 provides for the manufacture of 61,000 combines which will assure the overfulfilment of the five-year combine production plan a year ahead of time.

The Soviet Union was compelled to break new ground in the production of machinery for industrial crops, the cultivation of which depends to a considerable extent on hand labour even in the U.S.A. During the three years under review agriculture has received 4,170 wide flax-pulling machines and 8,400 tractor-drawn cotton cultivators. The mass production of sugar-beet lifters, potato planters, cultivators of various types and systems, and of numerous other machines, many of which are of original Soviet design, has been mastered as has the mass production of special tractors for row crops, the output of which reached 12,700 in 1935.

The fact that in 1935, on all collective farms, 50.1 per cent of spring ploughing, 56.4 per cent of fallow ploughing, 48.1 per cent of autumn ploughing, 30.4 per cent of grain harvesting and 47.2 per cent of sugar-beet harvesting were mechanized illustrates the extent to which hand labour has been eliminated in agriculture.

The State farms have already been transformed into mechanized grain, flax and cotton factories. In 1935, ploughing was fully mechanized, while more than 97 per cent of the entire State grain farm area was harvested by combines.

The principal means of raising the production of grain and industrial crops during the Second Five-Year Plan period must be increase in yield and not increase in sowing area. The Second Five-Year Plan accordingly provides for the introduction of a number of scientific farming measures in addition to equipping agriculture with modern machinery. In 1935, bare fallow constituted about 75 per cent of the total area under winter crops. Fifty per cent of the entire spring crop area for 1936 are to be sown on fallow land ploughed in 1935; forty per cent of the entire grain area were sown with pure-bred seeds. The entire area under sugar beet was sown with improved seeds and completely fertilized, while work was largely mechanized. Forty per cent of the area under cotton were sown, cultivated and harvested by machinery. Fifty per cent of the entire cotton area were sown with improved high-grade seeds.

All these measures assured an increase in the gross totals of all crops harvested. In 1935 more than 920,000,000 centners of grain crops were harvested, 30 per cent in excess of 1932; 17,000,000

centners of unginned cotton as against 12,700,000 centners in 1932; 5,500,000 centners of flax as against 5,000,000 centners; 162,100,000 centners of sugar beet as against 65,600,000 centners, etc.

The improved organization and economic growth of the collective farms, and the new Collective-Farm Model Rules adopted in the spring of 1935 have played an important part in raising crop yields. The new rules adopted by the general meetings of the collective farmers provide for the introduction of certain agronomic measures on the collective farm concerned. The system according to which the incomes of the collective farms are distributed consists in making the share which each collective farmer receives at the end of the agricultural year depend directly on the total income of the collective farm, and on the quality and quantity of labour performed by him.

In 1935, we witnessed a great outburst of labour enthusiasm among the collective farmers. The Union-wide competition among tractor drivers and combine operators brought to the fore hundreds of workers who ploughed and harvested more than 500-600 hectares each for the season.

One may already venture the statement that for the Soviet Union cycles of good and bad harvests are a matter of the past. In pre-war agriculture climatic conditions played a decisive role, giving rise to extremely sharp fluctuations in the amount of crops harvested. Despite the fact that during the last three years climatic conditions in certain districts were extremely unfavourable, the Soviet Union harvested record crops for the third year in succession.

Stock-raising is the most difficult problem of agriculture, due to the fact that animal husbandry was particularly infested with kulak elements, and that kulak agitation in favour of the slaughtering of cattle during the years of the reorganization of agriculture had resulted at the beginning of the Second Five-Year Plan period in a sharp decline in the number of cattle—a decline which did not cease even in 1933, except in the case of hogs. It was only in 1934 that a considerable improvement was to be noted. At present the restoration of stock-raising is proceeding steadily and, what is particularly important, at an increasingly rapid tempo.

The changes in the numbers of the principal kinds of cattle, according to the census taken on the first of June of each year, appear from the following data (in million head):

	1929	1933	1934	1935
Horses	34.0	16.6	15.6	15.9
Cattle	68.1	38.6	42.4	49.3
Sheep and goats	147.2	50.6	51.9	61.1
Hogs	20.9	12.2	17.4	22.6

In 1935, the decline in the number of horses which had continued for the last five years came to a halt. In a year's time (June 1934 to June 1935) horses increased by 300,000 head, cattle by 6,900,000 head, sheep and goats by 9,200,000 and hogs by 5,200,000. Figures for the *end* of 1935 show the following increases for the year: for horses, 700,000; for cattle, 7,200,000; for sheep and goats, 10,100,000; for hogs 6,400,000.

The State plan for the development of stock-raising which went into effect on January 1, 1935 has done much to improve matters. It assigned quotas to all sections of agriculture for the increase of all livestock, for the rearing of young stock and the creation of an adequate fodder base.

The increase and preservation of young stock are the chief factors in the solution of the stock-raising problem. The number of young stock up to one year of age rose as follows in 1935: colts, 57.8 per cent; calves, 23.8 per cent; lambs and kids, 17.6 per cent; young pigs, 31.2 per cent. There has been a marked increase in the proportion of young stock in the herds. When compared with 1928, the best year for stock-raising in the Soviet Union known hitherto, the year 1935 can show the following increase in the numbers of young stock up to one year of age per mother animal: for mares, 64 per cent; cows, 20 per cent; sows, 10.5 per cent.

Thanks to the marked development in all branches of agriculture, its gross production increased in 1935 by 11 per cent in comparison with 1934 and by 22 per cent in comparison with 1932, equivalent to an average annual increase of over 7 per cent for the three years. If this increase is compared with the average increase of agricultural output in the U.S.A. in 1925-29 (1.7 per cent), and with that of the U.S.S.R. in 1926-29 when small peasant farming prevailed (2.7 per cent), the vast superiority of the socialist mode of production in agriculture becomes clearly apparent.

The Second Five-Year Plan period had set the task of establishing the conditions necessary for the complete elimination of the confrast between town and country. The past three years have been marked by great progress in the solution of this problem: the

adoption of socialist forms of economy by the vast bulk of the peasantry, the mechanization of farming, the basing of agricultural production on scientific principles, the overcoming of the age-old backwardness of agriculture, the approximation of the rate of increase of agricultural production to that of industrial production, the growing well-being and culture of the peasantry and the inculcation of a socialist attitute toward work in the minds of the peasant masses are all processes which tend to eliminate to an increasing extent the contrast between town and country.

3. *Transportation*

The rapid growth of all branches of national economy, the opening up of new districts, the throbbing economic life throughout the whole country, have confronted the railroads, the principal mode of transportation in the U.S.S.R., with a number of difficult tasks. Accordingly, the Government has adopted numerous measures to accelerate their technical re-equipment. Capital investments in railroad transportation totalled 8,500,000,000 rubles during the first three years of the Second Five-Year Plan period, as against 6,400,000,000 rubles during the entire First Five-Year Plan period. The value of construction put into operation was 8,100,000,000 rubles as against 5,600,000,000 rubles during the whole of the first five-year period.

One of the measures talken was to re-equip the rolling stock.

During the First Five-Year Plan period the principal type of freight locomotive became the type "E" engine, the tractive power of which is 75 per cent greater than that of the most widely used engine in pre-war Russia. Under the Second Five-Year Plan the output of type "E" locomotives, 2,045 of which were produced in 1933-35, is being supplemented by the manufacture of type "FD" (Felix Dzerzhinsky) locomotives whose tractive power exceeds that of the type "E" locomotive by 30 per cent; 724 "FD" locomotives have already been put out.

Of the powerful "SU" passenger locomotives, 772 units have been produced. Electric locomotives have been put into operation to serve sectors having difficult grades, and Diesel locomotives for sectors lacking adequate water supply.

During the last few years the number of railroad cars has considerably increased. In 1935, the U.S.S.R. produced 90,800 railroad cars, the total number of cars in use rising from 552,000 in 1932 to 671,200 (in 2-axle equivalents) in 1935.

The increase and renewal of freight cars was accomplished in the main by the introduction of 4-axle cars, gondolas, hoppers, tank cars, isothermic and container cars, the manufacture of which multiplied several times in 1935 in comparison with 1932. The Five-Year Plan for the manufacture of freight cars will be fulfilled in four years, and for freight locomotives in less than five years.

In order to increase the speed and safety of traffic, the Five-Year Plan provides that by the end of 1937 all railroad cars be equipped with automatic brakes and air-line pipes. In 1935, 36.7 per cent of all cars were already equipped with automatic brakes, and the remaining 63.3 per cent with air-line pipes. During the three years 20,000 cars were provided with automatic couplings.

A number of the most important trunk lines have installed the automatic block system (3,700 km.), the semi-automatic block system (17,800 km.), automatic regulation, the electrification of switches, radio stations, etc.

During these years the trackage was reconstructed by the laying of new ties, increasing their number per km. and strengthening the crushed stone and gravel ballast. More than 5,000 km. of rail were changed. To enhance the carrying capacity of a number of sectors, additional lines have been built and yard tracks lengthened. The total length of railroad lines has increased 1,200 km. during 1934-35.

Electrification is a most important element of railroad reconstruction. More than 1,000 km. have been electrified during the Second Five-Year Plan period. The principal electrified lines run through the Urals, Transcaucasia and the suburban zones of Moscow and Leningrad. Though considerable work has been done in electrification, the latter is still behind the quotas set by the Plan and the chief burden of fulfilling the five-year railroad electrification program will have to be borne by the last two years of the five-year period (1936-37).

During the first two years of the Second Five-Year Plan period, the railroads still lagged behind and partly impeded the growth of national economy.

In order to remedy this situation, the government, in addition to speeding up the technical re-equipment of the railroads, issued instructions to reorganize the system of administration and to overhaul obsolete wage schedules. Measures were also taken to improve labour discipline.

It was not long before these steps yielded results. Beginning

with February 1935, railroad transportation exhibited a steady upgrade movement. Cases of delay in freight shipments are now a thing of the past. Railroad transportation is making rapid progress, the quality of its work has greatly improved, and at the present time there is every prospect that it will fulfil its assignment for the Second Five-Year Plan period in four years.

Freight turnover by rail for the last few years and for 1913 was as follows:

Years	Freight hauled (in mill. tons)	Average daily loadings (in thous. carloads)	Freight turnover (in bill. ton-km.)
1913	132.4	27.4	65.7
1928	156.2	32.3	93.4
1932	267.9	51.2	169.3
1933	268.1	51.2	169.5
1934	317.1	55.7	205.7
1935	390.0	68.0	259.7
1937 (Plan)	475.0	79.0	390.0

During the last months of 1935, daily car-loadings regularly averaged 75-77,000 and at times even reached 80,000. For 1936 the railroads have been assigned the task of loading 78,500 cars a day on the average. This almost equals the quota assigned for 1937, which undoubtedly will be filled in 1936.

Actually, average daily car-loadings for the last quarter of the year, the most difficult quarter and for many years marked by a definite decline in car-loadings, reached the record figure of 75,114.

These achievements of the railroads are a result of the progress made in mastering the new transportation technique and in reorganizing railroad operations. The best proof of this is supplied by the decided improvement in all qualitative indices of railroad work.

The average daily run per freight locomotive has increased from 146 km. in 1932 and 168.5 in 1934 to 193 km. in 1935. The average daily run per freight car has increased from 97.32 km. in 1932 and 117.2 km. in 1934 to 130 km. in 1935.

The Stakhanov movement in railroading has taken in all the chief categories of railroad workers—locomotive engineers, firemen, conductors, oilers, switchmen, dispatchers, etc. Stakhanov locomotive engineers drive freight trains at a speed of more than 45-50 km. without accident or uncoupling, while the average ser-

vice speed achieved in the Soviet Union is 17-18 km. an hour. Thus they open up great possibilities for accelerating the turnover of the rolling stock and effecting an increase in the freight shipped.

Beginning with October 1, 1935, a fixed schedule was drawn up for the movement of freight trains on Soviet railroads; this immediately improved the organization of work in all departments. Railroad transportation is a vast conveyor constantly in motion. This conveyor is now working better than ever before. The railroads have ceased to be a brake on the development of other branches of economy and the rapid successes scored by the army of railroad workers have fostered the conviction that the railroads will take a foremost place in the Soviet economic system.

Much construction work has been done in the field of waterway transportation. The total of capital investments in river and maritime transportation during the first three years of the Second Five-Year Plan period is almost twice as great as the sum invested during the entire First Five-Year Plan period. The aggregate capacity of freight and passenger boats in river transportation, expressed in thousand i.h.p., rose from 188,000 in 1932 to 222,000 in 1935, while the figure assigned for 1937 is 260,000 i.h.p. The tug-boat fleet has grown from 322,000 i.h.p. to 400,000 i.h.p., with 500,000 i.h.p. planned for 1937.

In 1933 the new White Sea-Baltic Canal was opened to traffic.

Work on the construction of the Volga-Moscow Canal is proceeding rapidly, some of its projects having been completed and put into operation as early as 1935.

The maritime merchant fleet is being increased both by the construction of a number of ships within the country and by extensive purchases abroad. Scores of lumber boats, refrigerator boats, tankers, Diesel boats, etc., have been added to the list of sea-going vessels.

In order to increase the volume of waterway transportation, measures have been taken to further improve equipped and lighted riverways, to mechanize loading and unloading, improve warehousing, reconstruct port facilities, reorganize the use of electrical and radio communication, extend dispatcher service, etc.

As a result of these measures the volume of tugged river transportation has increased from 46,900,000 tons in 1932 to 64,000,000 tons in 1935. Freight shipments carried in sea-going bottoms increased from 14,800,000 tons in 1932 to 26,200,000 tons in 1935.

Transportation is a vital factor in the defensive strength of the

country. This circumstance brings out in bold relief the significance of the fact that transportation is keeping pace at the present time with all the other rapidly growing branches of national economy, thus ensuring high rates of development for national economy as a whole and the enhancement of the country's defensive strength.

III. Rising Welfare and Cultural Standard of the Working People of the U.S.S.R.

Socialism creates a life of well-being and culture for all working people; it means care and attention to each individual worker. "We must first of all learn to value people," said Stalin, "to value cadres, to value every worker capable of benefiting our common cause. It is time to realize that of all the valuable capital the world possesses, the most valuable and most decisive is people, cadres. It must be realized that under our present conditions, 'cadres decide everything'."

The past three years were characterized by a further and rapid rise in the living standards of the people.

The abolition of the card system for the rationing of supplies was a most important measure in this regard. The card system was introduced at the beginning of the First Five-Year Plan period to enable the State to satisfy at low prices the foodstuff requirements of the urban population, the Red Army and the population of districts specializing in industrial crops, at a time when agriculture was still in a backward state.

Gathering momentum, agriculture at the present time is making solid progress. The reconstructed food industry is increasing its output from year to year. In 1935, the total output of this industry under the People's Commissariat of Food Industry exceeded that of 1934 by 22.4 per cent. Foodstuffs—bread, meat, fats, sugar, etc.—have become plentiful throughout the land and thus the causes that made the card system necessary have ceased to exist. By now all conditions have been established for the rapid development of light industry. In 1935 its output increased 9.5 per cent, while in 1936 the planned increase is 25.9 per cent, a higher rate than that of heavy industry, made possible by the good harvest of cotton, flax and other industrial crops.

The Second Five-Year Plan assigned the task of preparing the way for the abolition of the card system, but actually the card

system was already done away with in 1935. This proved a great incentive to commodity circulation which in 1935 reached a total of 80,470,000,000 rubles, or double the 1932 figure.

The improvement in the material well-being of the people has been strikingly reflected in the increased variety of goods offered for sale. There is an increasing demand for high-quality merchandise. Today radio sets, cameras, musical instruments, bicycles, phonographs, etc., are eagerly bought by the workers and peasants. These are the commodities which despite the big increase in their production still fall far short of the demand. One must know the utter dreariness of life in the countryside before the Revolution to be able fully to appreciate the progress which the Soviet collective farm village has made with its constantly increasing demand for cultural supplies.

At the same time that the card system for foodstuffs was abolished, prices for the latter were reduced. By decree of the Government, prices of foodstuffs were lowered 33 per cent on the average as of October 1, 1935. The price reduction in State and co-operative trade was followed by price reductions on the collective-farm markets. In 1935 prices on these markets were cut in half in comparison with the preceding year.

The increase in the number of employed persons and the rise in total wages were important factors making for improvement in the material well-being of the population. Unemployment had been finally and irrevocably abolished as early as 1930. By 1935, the number of employed persons had increased by 1,800,000 as compared with 1932. Total wages grew from 32,700,000,000 rubles in 1932 to 56,200,000,000 rubles in 1935. The average annual wage per worker in national economy as a whole rose from 1,427 rubles in 1932 to 2,271.5 rubles in 1935.

Particularly large increases in workers' wages were brought about by the Stakhanov movement. Thanks to the graduated premium system of wage payments, many thousands of Stakhanov workers are now earning more than 1,000 rubles a month.

The increase in total wages was accompanied by an increase in expenditures for cultural and social services extended to the workers. These increased expenditures of the State and the trade unions rose in industry, transportation, etc., from 4,300,000,000 rubles in 1932 to 7,600,000,000 rubles in 1935.

According to a survey, made in 1934, of 83,000 out of the 240,000 collective farms, the quantity of grain products received

in payment for work performed increased from 5.5 centners per collective-farm household in 1932 to 10.9 centners in 1934, *i.e.*, a 2-fold growth. By the end of 1936 all collective-farm households will have been provided with cows. The collective farmer has no worries about the purchase of seed, means of production or tractive power. The collective farm secures all this for him. The farmer in the U.S.S.R. has no rent to pay for his land. At the present time a special deed is issued by the State to each collective farm, transferring the use of its land to it in perpetuity. With the agricultural tax, which absorbs only an insignificant fraction of the farmers' income, representing a fixed sum, and the quotas of obligatory grain sales to the State remaining fixed irrespective of the rapidly increasing incomes of the collective farmers, the farmers' standard of well-being is directly dependent upon the quality and quantity of work done by them.

The conferences between the Government and people who have gained distinction in the various lines of production brought to light striking instances of the growing welfare of the workers and collective farmers. In the winter of 1935 the Government held such conferences with Stakhanov workers in industry and transportation, with collective farmers who had achieved sugar-beet crop yields of over 500 centners a hectare, with the best combine operators, with the most efficient collective-farm cotton growers of Central Asia and Kazakstan, with construction workers and engineers, and collective farm tractor drivers who had scored new records.

All the speeches of the workers and collective farmers were full of interesting facts showing how life had become easier and more joyous, how the introduction of Stakhanov methods in industry and transportation and the increasing application of scientific methods and of mechanization to agriculture had resulted in an unprecedented rise in workers' wages and the incomes of collective farms and their members.

The rise in the national income is the most general expression of improvement in the material well-being of a country where the entire national income is placed at the disposal of the working people. In 1935 the national income (in fixed 1926-27 prices) was 65,700,000,000 rubles as against 45,500,000,000 rubles in 1932 and 21,000,000,000 rubles in 1913.

The Second Five-Year Plan makes provision for much housing construction and great municipal improvements. During the past

three years street car service was started in 15 cities, water pipes laid for the first time in the same number of cities, and sewer pipes in 21 cities, while approximately 500 new public baths were built. The first line of the Moscow Subway, the best in the world in technical and architectural design, was completed and opened. Work on the construction of its second line is developing, 40,000 workers having been employed for this purpose at the end of 1935.

The ten-year plan for the reconstruction of Moscow, which was adopted by the Government in 1935, is of the greatest significance in the field of municipal development. This plan provides for the construction of dwelling houses having an aggregate housing space equal to that of present-day Moscow, *i.e.*, a total of 15,000,000 sq. metres (about 2,500 big apartment houses). The Plan further provides for the erection of 6 hotels, 530 schools, 50 motion picture theatres, etc., the straightening of numerous streets and the laying out of a number of new thoroughfares. In scale and unity of purpose permeating all its constituent elements, this reconstruction plan far excels anything done heretofore in city planning throughout the world.

The housing problem is very acute in the U.S.S.R. Housing construction did not keep pace with the growth of the urban population, the rates of increase of which were particularly high in districts of rapid industrialization. During the three years of the Second Five-Year Plan period, 17,000,000 sq. metres of housing space were built and opened for occupancy. Housing is still a lagging sector of construction. Therefore the Government has provided, in the Plan for 1936, for a vast increase in capital investments in housing construction so that the fulfilment of the quota set by the Second Five-Year Plan may be assured.

The increasing concern of the State for the well-being of the people finds expression in great building activity in the field of public health. During the past three years notable progress was achieved in medical, sanitary, crèche and health-resort service. The number of hospital beds in cities rose from 230,000 in 1932 to 290,000 in 1935; in rural localities, from 107,000 in 1932 to 135,000 in 1935.

Hand in hand with the improvement in material conditions much has been done to develop construction for cultural purposes.

The Second Five-Year Plan provides for universal compulsory polytechnic education covering a seven-year course. Accordingly

there has been an increase in the number of children in schools of general education. The number of children attending such schools rose from 21,700,000 in 1932 to 25,500,000 in 1935, or 3.5 times the number of children attending school before the war. In tsarist Russia a peasant would send his children to school for two years at best, and then only his sons, and in the cities a worker would send his children for 3 to 4 years; whereas in 1935 all children in the cities and 67 per cent of those in rural districts who completed the fourth grade entered the fifth grade to continue their studies. Comparing 1932 with 1935, the number of children attending fifth to tenth grades increased from 3,600,000 to 6,700,000. Moreover, before the Revolution the high schools were attended by the children of the bourgeoisie and the big landowners, the intelligentsia, the clergy and the kulaks, while there was only a sprinkling of workers' and peasants' children.

Particular attention is being paid to creating all conditions necessary for improved quality of education.

The large school construction program now being carried out will make it possible to hold day sessions exclusively. In Moscow alone 72 big school buildings were built and fully equipped in 1935. In 1936, 152 additional schools are to be built in Moscow. In 1935 the total number of schools built in cities was 496, while in rural districts 1,000 elementary schools and 2,000 seven-year schools were erected. The annual current expenditure allowance per pupil has doubled since 1932.

In the course of this period instructions were issued by the Government for improving the general educational system. New school curriculums were drawn up and approved by the Government. The supply of standard text-books was assured, the output of school supplies was increased, etc.

During these years there was a considerable increase in special courses and schools of general education for adults. By 1932 the number of illiterates in the U.S.S.R. had been reduced to 10 per cent, and at the present time much is being done to abolish the remaining illiteracy and semi-literacy.

In 1935, 38,500,000 persons, or approximately 25 per cent of the entire population of the U.S.S.R., were studying in general educational and vocational schools. This includes both children and adults, but leaves out of account those studying in the various short-term courses of vocational or technical training.

During the years of the First and Second Five-Year Plan pe-

riods a widespread network of colleges, technical colleges and middle technical schools was established in order to meet the need for specialists. During the three years of 1933 to 1935, 1,300,000 persons were enrolled in colleges, technical colleges and middle technical schools, while 485,400 specialists with college or middle school training were graduated.

In order to provide improved training to specialists, the system of college education has been thoroughly reorganized during the Second Five-Year Plan period. Several small colleges were abolished, in compensation for which the remaining colleges were reinforced, courses of study were lengthened, graduation dissertations were made compulsory, the study of general scientific and special technical subjects was intensified, etc. All these measures considerably improved the qualification of the specialists.

Altogether 509,900 persons studied at colleges and technical colleges in 1935, as against 477,200 in 1932 and 124,000 in 1913.

Pre-school training is a constituent part of the educational system of the U.S.S.R. By 1935 the number of children in pre-school institutions (kindergartens and playgrounds) had increased by 627,000 as compared with 1932, the number at the present time being approximately 6,000,000.

The Soviet Government has created conditions for scientific institutions and scientific workers unparalleled anywhere in the world. In the U.S.S.R. scientific work, which is being carried on on a large scale, is financed entirely by the State. During the course of the Second Five-Year Plan period, the following projects among others are proceeding at accelerated rates of construction: the All-Union Institute of Experimental Medicine, Academy City for the Academy of Sciences, and the Lenin Public Library. Geological research and the work of expeditions for the comprehensive study of the natural wealth and productive forces of the country have taken on particularly great scope during the Second Five-Year Plan period.

Between 1933 and 1935, the number of places of entertainment increased by 9,000; furthermore, 2,285 motion picture theatres were equipped with sound installations and 150 new theatrical groups were formed. The tens of millions of people who have been stirred for the first time to cultural life make very great demands upon Soviet art.

No less is the demand for printed publications. The aggregate newspaper circulation per issue has risen from 35,500,000 to

37,000,000 in the period under review. The Soviet Union maintains first place in the world in respect to the number of books published, while editions are larger than in any other country. The works of Marx, Engels, Lenin and Stalin as well as the classics of general literature are published in millions of copies. The inadequate paper supply is the sole limiting factor here. Increased paper production is one of the most important conditions of the further development of the cultural revolution.

IV. General Conclusions and Prospects of Development

Certain disproportions in national economy which were inherited by the Soviet State or manifested themselves in the process of the restoration of national economy during 1922-26 and the ensuing reconstruction period, have been or are being done away with during the First and Second Five-Year Plan periods.

Industrialization has changed the relation between industry and agriculture. The U.S.S.R. has been transformed from an agrarian into an industrial country. Simultaneously the reconstruction of agriculture is putting an end to the traditional backwardness of the latter, is overcoming its slow rates of growth. In socialist society agriculture develops harmoniously with national economy as a whole.

Transportation, formerly a backward sector, is now being brought in line with the requirements of national economy. In 1935 the principal branches of economy—industry, agriculture and transportation—developed fairly evenly.

The backwardness of the border districts and nationality republics is being eliminated by a more even geographic distribution of the productive forces. Much progress is being made in transforming agricultural consumers' regions into producers' regions.

The great work accomplished in the training of new cadres is removing the disparity between the country's new technical equipment and the forces available for handling it. The successes achieved in the struggle to master the new technique demonstrate that the workers are raising their qualifications to a par with the new technique. The best proof of this is the Stakhanov movement.

Within industry the disproportion between the volume of machinery production and what is required for the technical reconstruction of the country has in the main been overcome. The lag

of the branches supplying fuel is being successfully eliminated. During the last few years the oil industry has been unable to keep pace due to insufficient drilling. The Government has taken steps to improve the work of the oil industry and there can be no doubt that this industry will soon fall in step with the others. The coal, peat and oil-shale industries are advancing rapidly. In volume and assortment of its output, the iron and steel industry satisfies almost completely the requirements of the machinery industry, transportation and the other principal branches of national economy. The non-ferrous metals industry, which during the last few years used to be classified as one of the lagging industries that did not fulfil their plans, has now become one of the rapidly progressing industries that fulfil and overfulfil their plans. The socialist reconstruction of agriculture ensures an adequate supply of raw materials for light industry and the food industry. The disproportion between raw material resources and the production possibilities of the industries producing articles of consumption has been eliminated. Proper utilization of raw materials and improvement in the quality of output are now the principal problems of these industries.

Large-scale industry as a whole fulfilled its yearly plan in 1935 both with respect to volume of output and all qualitative indices.

In agriculture, cadres of tractor drivers and combine-operators have been formed who have mastered the new technique. The definite improvement achieved in 1934-35 in the application of scientific-farming measures (early sowing, vernalization, ploughing of fallow land, weeding, autumn ploughing, etc.) is removing the disparity that began to be noted between the high level of machine technique attained by agriculture and its relatively low agronomical level. By Government decision measures were taken to strengthen the fodder base of the growing stock-raising industry.

Railroad transportation is undergoing reconstruction in all its departments. Reconstruction of the rolling stock is accompanied by a radical reorganization of the entire trackage, communication and the repair base.

The discrepancy between the rising cultural and material demands of the masses and their satisfaction is being successfully eliminated. The Government has taken steps to accelerate construction for social and cultural purposes (municipal, housing, hospital and school construction), to increase printing facilities and

augment the output of paper, scientific school supplies, electrical household supplies and similar commodities.

Internationally, the economic and financial position of the Soviet Union has gained in strength. During the last few years, the Soviet Union has had a favourable balance of trade. In 1935 the balance of payments also became favourable. Its foreign debts, which totalled more than 1,000,000,000 rubles, have now been reduced to 100,000,000 rubles, to cover which would require far less than a single year's gold output of the Soviet Union.

The steadfast policy of peace consistently pursued by the Soviet Government and the measures taken to increase the defensive strength of the country, as a result of which the U.S.S.R. has become a first-class military power, have greatly enhanced the prestige and weight of the Soviet Union in international affairs.

All this does not mean that in future the Soviet Union will have plain and peaceful sailing, without any difficulties, or that we shall rest content with what has been achieved. The strength of the Soviet Government consists in the fact that it has clear perspectives, that it is fully aware of the difficulties of development, and is able, together with the Communist Party of the Soviet Union, to mobilize the entire people to overcome these difficulties. The U.S.S.R. sets itself the task of achieving a level of development of the forces of production that will completely satisfy all the constantly increasing demands of the people. The U.S.S.R. sets itself the task of eliminating the contrast between town and country, between mental and physical labour, of completing the building of socialist society and of proceeding to the creation of Communist society.

Stalin in his speech at the First All-Union Conference of Stakhanovites (November 17, 1935) pointed out the following differences between socialism and communism:

"The principle of socialism is that in a socialist society each works according to his ability and receives articles of consumption not according to his needs but according to the work he performs for society. This means that the cultural and technical level of the working class is still not a high one, that the distinction between mental and manual labour persists, that the productivity of labour is still not high enough to ensure an abundance of articles of consumption, and, as a result, society is obliged to distribute articles of consumption not in accordance with the needs of the

members of society, but in accordance with the work they perform for society.

"Communism represents a higher stage of development. The principle of communism is that in a communist society each works according to his abilities and receives articles of consumption not according to the work he performs, but according to his needs as a culturally developed individual. This means that the cultural and technical level of the working class has become high enough to undermine the basis of the distinction between mental labour and manual labour, that the distinction between mental labour and manual labour has already disappeared, while productivity of labour has reached such a high level that it is able to ensure an absolute abundance of articles of consumption, and as a result society is able to distribute these articles according to the needs of its members."

The main and irrevocable consequence of the development of the U.S.S.R. is the fact that *all the chief difficulties of socialist construction are behind*. The extent to which the new technique has been mastered by the country is so great that national economy in its entirety is assured of harmonious and rapid progress.

In the course of the fulfilment of the Second Five-Year Plan new factors, which must find their reflection in the further fulfilment of the Five-Year Plan, have made their appearance. The Stakhanov movement opens up new possibilities of growth, and therefore the rates of increase of output can be set higher during the last two years of this second five-year period than heretofore; increased labour productivity will be the main factor in determining rates of output. Thus the problem of the construction program likewise presents itself in a new way. It has already become quite clear that we can fulfil the production quotas assigned by the Second Five-Year Plan with a smaller volume of capital investments than planned before. This makes it possible to devote a greater proportion of the national income to consumption, and increase the share of capital investments in construction for social and cultural purposes.

According to the Plan, 1936 will be a year of further expansion of socialist production, and increasing material well-being and cultural development for the working people. A particularly noteworthy feature of the Plan for 1936 is the fact that this year the rates of increase of output will be considerably in excess of those

obtained in any of the preceding years of the Second Five-Year Plan period. Thus in 1936 the output of industry as a whole under Union jurisdiction will show a growth of 23 per cent. For the People's Commissariat of Heavy Industry, this increase amounts to 26 per cent; for the People's Commissariat of Timber, 22.3 per cent; for the People's Commissariat of Light Industry, 29.2 per cent and for the People's Commissariat of Food Industry, 22 per cent. For individual industries the increase is as follows: electric-power generation, 22 per cent; coal mining, 22 per cent; iron and steel industry, 23 per cent; non-ferrous metals, 32 per cent; machinery production and metal working, 31 per cent; chemical industry, 19 per cent; cotton goods, 27 per cent; linen goods, 57 per cent; silk, 42 per cent; meat, 31 per cent; sugar, 30 per cent; leather and footwear, 26 per cent; confectionery, 30 per cent.

In January 1933, Stalin pointed out that the enthusiasm, the fervour for new construction must be supplemented "by enthusiasm, by fervour for *mastering* the new factories and the new technique, for seriously increasing the productivity of labour, for seriously reducing cost of production." He went on to say: *"This is the main thing now*. Because only on this basis will we be able, say, toward the middle of the Second Five-Year Plan period, to make a fresh powerful spurt forward in the sphere of construction as well as in the sphere of increasing industrial output."

This prediction is now coming true in every respect. In 1935 the country made "a fresh powerful spurt forward," which finds its expression in the vast increase in construction and production provided for by the Plan of 1936.

In 1936 capital investments will total 32,400,000,000 rubles as against 24,000,000,000 rubles specified in the Plan for 1935. This means that in 1936 alone the volume of construction will be equal to one half of the entire construction for the first three years of the Second Five-Year Plan period. Especially great is the growth of capital investments in industries producing articles of consumption and in construction for cultural purposes. Thus, while capital investments in industries producing means of production are growing 9.5 per cent, in industries producing articles of consumption they are increasing 55 per cent and will constitute 3,309,000,000 rubles, *i.e.*, almost as much as was invested in these industries during the whole of the First Five-Year Plan period. Investments in municipal construction are rising from 1,400,000,000 rubles to 1,885,000,000 rubles, or 35 per cent; in

education and public health, from 980,000,000 rubles to 1,970,000,000 rubles or over 100 per cent; in housing construction, from 1,930,000,000 rubles to 3,065,000,000 rubles, or 58.8 per cent.

Taking into account the successes achieved during the past three years and the great possibilities created by the Stakhanov movement, the Plan for 1936 provides for raising the output in a number of industries by the end of the year to a higher level than was set by the Five-Year Plan for this year.

Classification	Units of measurement	Quotas for 1936 according to Five-Year Plan	Quotas for 1936 according to revised yearly plan
Electric-power generation	mill. kwh.	30,000	32,000
Coal	mill. tons	126.6	135.0
Pig iron	"	14.0	14.5
Steel	"	14.8	16.0
Rolled steel	"	10.5	12.2
Metal-cutting machine-tools	thousands	31.0	34.0
Tractors (in 15-h.p. equivalents)	"	145.9	154.3
Freight cars (in 2-axle equivalents)	"	67.4	90
Motor trucks	"	103.0	144.5
Harvester-combines	"	20.0	61.0

This overfulfilment of the assignments of the Second Five-Year Plan signifies that it will be quite possible to complete this plan in a number of industries in advance of schedule.

Based upon the growth of labour productivity in 1936—in heavy industry 23 per cent, in light industry 21 per cent—production costs will be reduced considerably, the decrease amounting to 6.2 per cent for industry as a whole and to 8 per cent for heavy industry.

A considerable increase in freight shipments has been planned for 1936. In railroad transportation this increase is set at 17.2 per cent (from 390,000,000 tons to 457,000,000 tons); in river shipping, 18.1 per cent (from 64,000,000 tons to 75,600,000 tons); and in maritime shipping, 20 per cent (from 26,200,000 tons to 31,600,000 tons).

The growing mass production of manufactured articles of general consumption, the developing commodity circulation (retail trade turnover rising by 24 per cent or 100,000,000,000 rubles), the reduction in prices and the rise in wages accompanying increased

labour productivity all lead to a further and still more accelerated improvement in the material welfare of the working people.

There must be a new approach to a number of problems involved in methods of planning. Collectivization has made the direct planning of agriculture possible, and thus all branches of national economy are now embraced by State planning.

Balance-sheets, which are drawn up not only for the five-year period as a whole but also yearly and in numerous instances even quarterly, are acquiring increasing importance in the elaboration of the Plan. At the present time the following balances enter into the composition of the Plan: fuel, ferrous and non-ferrous metals, chemicals, building materials, machinery, agricultural raw materials for industry, and fodder. There is a unified plan for freight turnover to cover all systems of transportation. There is a unified financial plan which embraces the budgets and the credit system, also the funds of social insurance, State insurance as well as the funds of social organizations; there is likewise a unified plan for the training of cadres.

The abolition of the ration card system has strengthened the ruble and enhanced the importance of cost accounting. The ruble has become the sole medium of exchange and payment. The system of wage payments for workers and the engineering and technical personnel has established a direct interdependance between quality and quantity of labour expended and wages received. All enterprises in industry and transportation have been put on a cost-accounting basis. This has immeasurably increased the significance of the ruble and of cost accounting as incentives and controlling factors of plan fulfilment.

The past three years have been characterized by persistent efforts to render industry profitable and to increase this profitableness. In 1935 profits in heavy industry totalled 1,701,000,000 rubles, as against 1,085,000,000 in 1933 and 438,700,000 in 1931. This increase in profitableness is a striking expression of the rapid growth and flourishing state of Soviet industry.

Planning has likewise improved. Plan assignments reflect to an increasing degree all the objective possibilities of growth inherent in the social-economic order of the U.S.S.R. The increasing experience of the workers engaged in planning has contributed considerably to this end.

The national-economic Plan is not an abstract mathematical calculation but a directive, a guide to action. The organizing in-

fluence of the Plan, particularly now when all branches of the country's economy are subject to direct planning, is exceptionally great. By their persistent, heroic struggle the millions of the Land of the Soviets ensure the fulfilment of the Second Five-Year Plan, the Plan of great social and technical transformations.

In view of the prospect of successful completion of the Second Five-Year Plan, the planning bodies with the participation of the entire Soviet Union will in the very near future proceed to elaborate the Third Five-Year Plan for the Development of the National Economy of the U.S.S.R.

V. I. MEZHLAUK

Chairman of the State Planning Commission of the U.S.S.R.

January 1936

PREFACE

THE Second Five-Year Plan for the Development of the National Economy of the U.S.S.R. has been worked out by the State Planning Commission of the U.S.S.R., confirmed by the Seventeenth Congress of the Communist Party of the Soviet Union and adopted by the Central Executive Committee and the Council of People's Commissars of the U.S.S.R. It is a fully elaborated program of planned measures and tasks whose object is to carry out the decisions of the Party and the Government on the Second Five-Year Plan.

The successful completion of the First Five-Year Plan made it possible to encompass the development of all branches of national economy much more fully in the Second Five-Year Plan. Thus, for instance, the planning of the development of industry in the Second Five-Year Plan embraces not only large-scale industry but all industry in the U.S.S.R. Transportation in all its forms is also treated more inclusively. The socialization of agriculture and of commodity circulation have made it possible to comprise in the Plan also these branches of national economy with far greater completeness.

In pursuance of the goal of completing technical reconstruction, the Second Five-Year Plan sets up technical and economic indices on a wide scale. These indices are the basis of the specifications for quantity, quality and cost of production in the various branches of national economy.

At the time the Second Five-Year Plan was being drawn up, statistical reports on the course of fulfilment of the national economic plan for 1932 had been received from most branches of national economy. This made it possible to give more accurate data for the majority of indices than appeared in the *Summary of the Fulfilment of the First Five-Year Plan* published by the State Planning Commission of the U.S.S.R. in 1933. In the second edition of that work, complete statistics are supplied for *all* indices. The figures for 1933 are based on preliminary calculations of plan fulfilment made by the Central Board of National Econo-

mic Accounting of the State Planning Commission and the corresponding People's Commissariats. They are to be presented with greater exactitude in the publications of the Central Board of National Economic Accounting.

In the Second Five-Year Plan the value of output is given in fixed 1926-27 prices. The construction plan is given in the prices of the Plan of 1933 while the summary tables also show the 1932 prices.

The summary tables of the construction plans have been compiled according to branches of national economy as well as according to People's Commissariats and organizations. The purpose of this was to show the total volume of capital investments made in any branch of economy (for instance, the indicated capital investments in industry take into account investments made by the transportation system, agriculture, municipal services, etc., in the industrial enterprises of these branches of economy) as well as the distribution of construction according to the various organizations directly engaged in this work.

In working out the Second Five-Year Plan the State Planning Commission of the U.S.S.R. relied on the mass of material and projects submitted by the People's Commissariats and by the Republic and Territorial (Regional) Planning Commissions.

The foremost scientists of the Soviet Union—the forces of the Academy of Sciences of the U.S.S.R., of about 200 scientific research institutes, over 300 leading specialists in various departments of science and technology and a number of the country's most prominent scholars collaborated on the Second Five-Year Plan and participated in the fifteen all-Union conferences called by the State Planning Commission of the U.S.S.R. to discuss and work out particular questions and sections of the Plan.

The Institute of Economic Research of the State Planning Commission of the U.S.S.R. as a body also took an active part in working out the Second Five-Year Plan. A list of the persons who participated in drawing up the Plan or worked out particular problems is appended to this volume.

The present publication is edited by a commission consisting of V. V. Kuibyshev (Chairman), V. I. Mezhlauk, E. I. Kviring, A. I. Gaister, G. I. Smirnov, B. V. Troitsky, I. A. Kraval, A. A. Troyanovsky and B. S. Borilin.

STATE PLANNING COMMISSION
OF THE U.S.S.R.

THE SECOND FIVE-YEAR PLAN FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R. (1933-37)

Resolution of the Seventeenth Congress of the Communist Party of the Soviet Union on the Reports of V. Molotov and V. Kuibyshev

(Adopted unanimously on February 10, 1934)

ALREADY during the First Five-Year Plan period, thanks to the heroic struggle of the working class, the foundation of socialist economy was laid, the last capitalist class—the kulaks (rich peasantry)—was routed and the basic masses of the peasantry—the collective farmers—became a firm support of the Soviet Government in the countryside. The U.S.S.R. finally established itself on the socialist road.

During the years covered by the First Five-Year Plan a large-scale, technically advanced industry was created in the U.S.S.R., and especially remarkable successes were achieved in the establishment of a modern heavy industry—the material base of socialism, the foundation of the reconstruction of the whole national economy and the condition for the accelerated development of light industry, the food industry and agriculture. Dozens of new branches of industry were organized: complex machine-tool construction, an automobile and tractor industry, harvester-combine construction, aircraft and aeroplane-motor construction, the manufacture of powerful turbines and generators, of special steels, ferro-alloys and aluminium, a modern chemical industry, a synthetic rubber industry, the manufacture of nitrates, artificial fibres, etc. The knit-goods, needle-trades, footwear, meat-packing, canning, paper and other industries were reconstructed on the basis of modern technique. Thousands of modern enterprises were built which elevated the whole national economy to a high plane of new technical culture, on a par with the best examples of capitalist technique.

Agriculture was radically reconstructed during the First Five-Year Plan period. The proletariat led by the Leninist Party convinced the millions of the peasantry of the superiority of collective production and created a new collective farm system in the countryside. The victories in the development of industry conditioned the gigantic successes achieved in switching agriculture to the track of machine-operated technique. The U.S.S.R. has become the country of the largest-scale agriculture in the world.

The great successes in the establishment of a new, socialist labour discipline, the improvement in the skill of the workers and the considerable achievements in the organization of production have made it possible to score enormous victories in promoting la-

bour productivity during the course of the technical reconstruction. In the rate of increase of labour productivity the U.S.S.R. outstripped all capitalist countries, even in comparison with the years of their greatest upsurge.

The proletariat, which has overcome the tremendous difficulties resulting from the realization of the First Five-Year Plan, achieved victories of historic importance in the matter of improving the position of the toilers in town and country. The superiority of the Soviet order, even at the stage of development attained, permitted of the complete elimination of unemployment, the introduction of the seven-hour working day and the abolition of destitution and pauperism in the countryside.

The worker and collective farmer have become fully confident of the morrow, and the constant elevation of the level of the material and cultural standards depends solely upon the quality and quantity of the labour expended by them. Gone is the menace of unemployment, poverty and starvation for the toiler of the U.S.S.R. Confidently and joyfully each worker and collective farmer looks into his future, and presents constantly rising demands for knowledge and culture.

During the First Five-Year Plan period the U.S.S.R. was transformed into a country of advanced culture. The illiteracy of tens of millions of workers and peasants was abolished and the introduction of universal compulsory elementary education was accomplished. Extra-school education was widely developed, the circulation of newspapers, magazines and other publications rose sharply. Considerable successes were achieved in developing scientific and technical research, which independently solved a number of very important technical problems.

In the national districts of the Union, which are making rapid progress towards finally overcoming their backwardness, particularly remarkable economic and cultural growth took place.

As a result of the First Five-Year Plan the possibility of building socialism in one country was practically demonstrated for the first time in the history of mankind before hundreds of millions of toilers of the whole world. All these successes of the First Five-Year Plan prepared the conditions precedent and a *mighty base* for the construction and realization of the Second Five-Year Plan.

"The chief political task of the Second Five-Year Plan is the final abolition of the capitalist elements and of classes in general; fully to destroy the causes which give rise to class distinction and

exploitation; to overcome the survivals of capitalism in economic life and in the minds of people; to transform the whole working population of the country into conscious, active builders of classless, socialist society." (*Resolution of the Seventeenth Conference of the C.P.S.U.*)

The final abolition of the remnants of the parasitic classes and the general growth of the national income which is placed entirely at the disposal of the toilers must ensure during the Second Five-Year Plan period a still more rapid improvement in the well-being of the worker and collective farm masses, a considerable growth of real wages, and a 2 to 3-fold rise in the level of consumption of the toilers.

The realization of these tasks is possible only on the basis of the broad technical reconstruction of the whole of national economy, of industry, of transportation, of agriculture. Therefore the completion of the reconstruction of the whole of national economy is the fundamental and decisive economic task of the Second Five-Year Plan period. Mastery of the new technique and of the manufacture of new products is necessarily the decisive condition for the completion of technical reconstruction in national economy during the Second Five-Year Plan period. "Fervour for *new construction*" must be supplemented during the Second Five-Year Plan period by "fervour for *mastering* the new factories and the new technique, for seriously increasing the productivity of labour, for seriously reducing cost of production." (Stalin.)

1. *The Completion of Technical Reconstruction in National Economy and the Program of the Growth of Production During the Second Five-Year Plan Period*

The Seventeenth Congress of the C.P.S.U. approves the program of the completion of technical reconstruction in the whole of national economy and the growth of production during the Second Five-Year Plan period submitted by the State Planning Commission of the U.S.S.R. and adopted by the Central Committee of the C.P.S.U. and the Council of People's Commissars of the U.S.S.R.

The Congress of the C.P.S.U. *resolves*:

1. To fix the volume of production of the whole of industry in 1937, *i.e.*, at the end of the Second Five-Year Plan period, at 92,700,000,000 rubles (in 1926-27 prices), as against 43,000,000,000 rubles in 1932, at the end of the First Five-Year Plan period, *i.e.*, an average annual increase of 16.5 per cent, or a 2.1-fold increase in the volume of industrial output and an approximately

8-fold increase in comparison with the pre-war level. To specify a more rapid rate of development in the production of manufactured articles of mass consumption not only in comparison with the First Five-Year Plan (an average annual rate of growth of 18.5 per cent as against 17 per cent during the First Five-Year Plan period) but also in comparison with the rates of development of the production of means of production during the Second Five-Year Plan period (an average annual rate of growth of 18.5 per cent as against a 14.5 per cent average annual rate of growth of the means of production).

2. To fix the extent of production in the most important branches of industry as follows:

Indices	Quota for 1937	
	Absolute	In % of 1932
Total volume of industrial output (billion rubles, in 1926-27 prices),	92.7	214.1
of which:		
Production of means of production	45.5	197.2
Production of articles of consumption	47.2	233.6
P. C. of Heavy Industry (billion rubles)	33.5	234.6
P. C. of Timber (billion rubles)	3.6	200.0
P. C. of Light Industry (billion rubles)	19.5	248.8
P. C. of Supply (billion rubles)	11.9	256.1
Machinery and other metal products (billion rubles, in 1926-27 prices)	19.5	207.0
of which:		
Metal-cutting machine-tools (thousand units)	40.0	267.0
Tractors (15 h.p. and equivalents, thousands)	167.0	323.0
Harvester-combines (thousands)	20.0	200.0
Trunk line locomotives (in equivalents of "E" and "SU" types, in units)	2 800.0	337
Freight cars (in 2-axle equivalents, thousands)	118.4	531
Motor cars (thousands)	200.0	837.0
Electric power production (billion kwh.)	38.0	283 0
of which:		
Regional stations under Chief Power Board	24.5	296
Coal (million tons)	152.5	237
Crude oil and gas (million tons)	46.8	210
Pig iron (million tons)	16.0	260
Steel (million tons)	17.0	289
Rolled products (million tons)	13.0	303
Chemical industry (billion rubles, in 1926-27 prices)	5.5	280
Lumber (million m^3)	43.0	176
Cotton fabrics (million metres)	5,100.0	188
Linen fabrics (million m^2)	600.0	461
Footwear (million pairs)	180.0	220
Granulated sugar (thousand tons)	2,500.0	302
Fish catch (thousand tons)	1,800.0	139
Meat (P. C. of Supply, thousand tons)	1,200.0	276
Canned goods (million cans)	2,000.0	335

In view of the fact that *local industry* can act as an important supplementary factor in the all-round satisfaction of the rapidly growing demands of the workers and collective farmers, the Congress fixes the growth of production of manufactured articles of general consumption of local industry during the Second Five-Year Plan period at three times the present output and instructs the local bodies to exert maximum initiative in the matter of developing local industry and finding new kinds of raw materials. At the same time the Congress instructs the Central Committee of the Party and the Council of People's Commissars to strengthen local industry by transferring a number of enterprises from the jurisdiction of the Union or the several Republics to that of the local authorities, and likewise to transfer a considerable part of the profits of local industry to the disposition of the local executive committees.

3. The Congress points out that in order to carry out the set program of development of industry and to realize the technical reconstruction of national economy it is necessary:

a) To carry out the *technical re-equipment* of all branches of national economy of the U.S.S.R., ensuring in the shortest period of time the introduction of the latest technical achievements and the receipt in 1937 of about 80 per cent of the whole output of industry from new enterprises built or completely reconstructed during the First or Second Five-Year Plan period. Means of production supplied to national economy during the Second Five-Year Plan period alone must at the end of the Second Five-Year Plan period constitute from 50 to 60 per cent of the means of production installed in the whole of national economy;

b) To so reconstruct the *machinery industry*—this leading branch of national economy—that it will ensure the satisfaction from Soviet resources of all demands of national economy for modern, technically advanced equipment by the vast development of new kinds of manufactures. In the Second Five-Year Plan period the production of up to 200 different types and sizes of the latest machine-tools must be mastered. The metallurgical machinery industry must master the complete equipping of all metallurgical shops, while the manufacturing of equipment for light industry and the food industry must master dozens of new types of machinery. The agricultural machinery industry must inaugurate the manufacture of all kinds of machines and tractor-drawn agricultural implements necessary for the realization of the further mechanization of agriculture, especially the mechanization of the

laborious processes in the cultivation of industrial and row crops. The production of road-building equipment, of equipment for municipal services, and for the building of dwellings and structures for public service must be extended;

c) To complete in the main the *mechanization* of all laborious and arduous processes in industry. In coal mining to raise the mechanization of cutting by the end of the Five-Year Plan period to 93 per cent, forcing up the level of mechanization of the remaining processes correspondingly; in the iron and steel industry, to raise mechanization to a level that will ensure the receipt of 80 per cent of pig iron from completely mechanized blast furnaces; in the peat industry, to set the output of peat extracted by mechanical means at more than 70 per cent of the total output; in the field of construction, to increase the mechanization of the principal processes to 80 per cent and to realize the mechanization of the manufacture of local building materials; to realize the mechanization of the principal timbering processes—to increase mechanization in hauling 6-fold, in stripping 3-fold; to realize the mechanization of charcoal burning;

d) To create a *new power base* for the completion of reconstruction in all branches of national economy and to create at all electric power centres reserve capacities ensuring uninterrupted electric power supply to national economy. To complete in the main the electrification of industry by utilizing on the broadest scale the latest electrical methods of production in all branches of industry, especially in the metallurgical and chemical industries (the growth of consumption of electric power by electric manufacturing processes to rise more than 9-fold), by the broad development of electrification of transportation and the gradual introduction of electricity into the production processes of agriculture. To develop heat and power for industry and the big cities on a wider scale. To continue the policy of utilizing more extensively such local fuels as Moscow Basin, Ural, East Siberian and Central Asian coal as well as peat and oil shale, and especially the water-power resources for the supply of electricity. To complete during the Second Five-Year Plan period the interconnection of the regional power stations within the districts and to begin the inter-regional linking up of stations, with the creation already during the Second Five-Year Plan period of the greatest electric power system in the world (the Donetz Basin-Dnieper system with an output of

9,000,000,000 kwh. a year). To develop the manufacture of gas from peat and oil shale;

e) To overcome completely the lag of the *iron and steel industry* behind the general rates of development of national economy. To double during the Second Five-Year Plan period the capacity of the iron and steel industry and to strive for the most rapid elimination of the disparity between the capacities of the blast furnaces and those of the steel-smelting works, especially the rolled products mills; to develop the production of the various types of metals—special steels, electric steel, ferro-alloys, complex shapes of rolled products and so forth—to an extent that will fully satisfy the demands of national economy; to reconstruct the iron-ore industry on a vast scale and extensively to apply the methods of concentration and agglomeration of ores.

To attain especially high rates of development and of technical re-equipment in the *non-ferrous metals industry*—to carry out the final transition to the modern method of copper extraction (flotation, refractory furnaces) and to apply the modern electrolytic method in the production of zinc on a large scale, so as to receive 70 per cent of all zinc by this method in 1937; to organize the production of tin, nickel and magnesium, and to develop on a wide scale the production of aluminium; to satisfy fully the non-ferrous metal requirements of the whole of national economy, especially those of electrification;

f) To attain decisive advances in the development of the *chemical industry,* ensuring the extensive introduction of chemical methods and processes in all branches of national economy and the reinforcement of the defensive strength of the country. To raise the output of all kinds of fertilizers during the Second Five-Year Plan period to ten times the present level; extensively to develop a number of new chemical industries (the chemical treatment of solid fuels—coal, peat, oil shale, new kinds of dyes, plastics, synthetic rubber and so forth); to introduce the latest technological processes into the chemical industry (broad development of electro-thermic and electrolytic methods, reactions in gas phases and so forth); to intensify the combination of the chemical industry with other branches of industry (the coking industry, non-ferrous metals industry, iron and steel industry and so forth) and to introduce a number of new kinds of raw materials;

g) To increase to a maximum extent the output of the most important branches of *light industry* and the *food industry* on the

basis of establishing large-scale machine production—raising the proportion of automatic weaving looms in the cotton industry to 40 per cent by the end of the Five-Year Plan period and substituting modern machines for obsolete spinning looms; to liquidate the technical backwardness of the linen industry by introducing high-speed looms and radically reconstructing the primary working up of flax; to realize the universal mechanization of the knitgoods, needle-trade and footwear industries; to create large-scale machine production in the meat industry on the basis of developing meat-packing plants. To raise the proportion of mechanized fish catch to 70 per cent of the total output of the state fisheries by considerably reconstructing the technical equipment of fishing boats, etc.; to reconstruct on a broad scale the vegetable-oil industry on the basis of introducing the most efficient extraction process.

4. The realization of the task of the technical reconstruction of industry demands the successful mastery of the new technique and of new manufactures, which must find expression in a considerable growth of the *productivity of labour* and a serious lowering of the *cost of production.* The Congress accordingly specifies:

a) A growth in the productivity of labour in industry during the Second Five-Year Plan period of 63 per cent as against 41 per cent during the First Five-Year Plan period, *i.e.,* to an extent that will cause the productivity of labour to become a decisive factor in the fulfilment of the scheduled plan of increased production during the Second Five-Year Plan period;

b) The lowering of the cost of production in all industry by 26 per cent, as compared with the level of the cost of production in 1932, ensuring accumulation in 1937 through lowered production costs to the extent mapped out—not less than 13,000,000,000 rubles;

c) Simultaneously with the lowering of the cost of production, to attain a sharp improvement in *quality* and *assortment* of output in all branches of national economy. To attain a considerable diminution of the ash and sulphur content in coal, to increase the number of grades in the iron and steel industry, to improve the quality and the use factor of machines, to raise the grade of yarn, decidedly to improve the quality of cotton and linen goods, to increase the proportion of fine cloth and worsteds in the woollen goods industry, to increase the proportion of fine wool in fabrics, decidedly to improve the quality of soap by increasing the fatty

matter content, to improve the quality of footwear by using better methods of sewing and better raw materials, to improve the quality of the products of the meat-packing industry by raising the proportion of pork, sausage and edible fats; to improve the quality of fish output by increasing the proportion of the better grades of fish; to improve considerably the assortment and the production of the flour-milling industry by increasing the proportion of high-grade flour.

5. The Seventeenth Congress fixes the growth of production in the whole of *agriculture* during the Five-Year Plan period at from 13,100,000,000 rubles (in 1926-27 prices) to 26,200,000,000 rubles, or a 2-fold increase.

In the most important branches of agriculture, the Congress makes the attainment of the following production quotas obligatory: grain crops—1,048,000,000 centners with a yield of 10 centners per hectare; sugar beet—276,000,000 centners with a yield of up to 200 centners per hectare; cotton fibre—7,000,000 centners with a yield of 12 centners per hectare for irrigated cotton; flax fibre—8,000,000 centners with a yield of up to 3.7 centners, and to increase the quantity of livestock products 2.25 times.

6. The Congress emphasizes that the specified increase in agricultural products can be attained only on the basis of the absolute completion of collectivization and the realization of the technical reconstruction of the whole of agriculture, for which purpose it is necessary:

a) To transform the grain, livestock-raising, sugar-beet, cotton and other State farms into model agricultural enterprises on the basis of persistent effort to master the technique of large-scale machine production, of the universal adoption of proper crop rotation and seed selection, of improving the breed of livestock, of a rise in the quality of output and an increase in the quantity of grain, sugar beet, cotton, meat, milk, butter, hide and wool delivered to the State, and a decided improvement in the whole organization of production accompanied by a splitting up of the oversized State farms into smaller units, by the discontinuation of excessive specialization, etc.;

b) To increase the number of machine and tractor stations from 2,446 in 1932 to 6,000 in 1937, thus providing all collective farms with machine and tractor station service;

c) To increase the aggregate rating of the tractors from 2,225,000 h.p. in 1932 to 8,200,000 in 1937, *i.e.*, a 3.7-fold increase;

to raise the number of harvester combines to 100,000 and the number of motor vehicles in agriculture to 170,000 cars, *i.e.*, a more than 12-fold increase;

d) To complete in the main the mechanization of agriculture: tractor-operated ploughing, including fall ploughing in 1937, must constitute 80 per cent, cultivation—70 per cent, grain harvesting by means of tractor-drawn harvesters—60 per cent and the mechanization of threshing—85 per cent of the total.

e) To introduce agronomic measures systematically on a large scale: to introduce proper crop rotation everywhere, to sow 75 per cent of the area under grain crops with assorted seed, to do fall ploughing on 50 per cent of the sown area;

f) To increase the supply of nitrogen fertilizer during the Second Five-Year Plan period from 6 per cent to 80 per cent of the area sown to cotton, for areas sown to sugar beet—from 6 per cent to 40 per cent and to supply phosphate fertilizer for the whole, instead of for 9 per cent, of the sown area; also widely to develop irrigation by enlarging the irrigated area by an additional million hectares.

7. The Congress sets the following increases in the *freight traffic* of the main modes of transportation: railroads—from 169,000,000,000 ton-km. in 1932 to 300,000,000,000 ton-km. in 1937; river transportation—from 26,000,000,000 ton-km. to 63,000,000,000 ton-km.; maritime—from 18,000,000,000 ton-km. to 51,000,000,000 ton-km. and trucking—from 1,070,000,000 ton-km. to 16,000,000,000 ton-km.

To the end that freight shipments may be more rationally distributed among the individual modes of transportation, the Congress points to the necessity of raising the proportion of the new modes of transportation in the country's freight service—motor highway and airway transportation, also waterway transportation, while railroad transportation retains its basic role.

8. The Congress stresses the necessity of the *technical reconstruction of transportation and communication* which must be carried out along the following basic lines:

a) The reconstruction of the most important *railroad lines*—the electrification of 5,000 km. of railroad lines, the laying of 9,500 km. of second tracks at the most congested trunk lines (the Ural-Kuznetsk Basin, the Transbaikal and Ussuri railroads, the railroads of the Donetz Basin and so forth); the increase in the length of the tracks at stations and junction points to a total of 8,500 km.;

the replacement of light rails by heavy rails for a length of up to 20,000 km.; the extensive construction of bridges; the equipment of 8,300 km. with automatic block signals; the strengthening of the lines in operation (the adoption of crushed stone ballast, increase in the number of ties per km. of trackage);

b) An increase in the total number of locomotives from 19,500 in 1932 to 24,600 in 1937 with the simultaneous change to more powerful and perfected types of locomotives. The powerful "FD" engine must in the Second Five-Year Plan period become the basic freight locomotive, and the powerful engine type "JS" the basic passenger engine; Diesel locomotives and electric locomotives must find more extensive application;

c) A growth in the number of railroad cars from 552,000 in 1932 to 800,000 in 1937 (2-axle equivalents) with a considerable increase in the proportion of heavy freight cars and the equipment of all cars with automatic brakes and not less than half the number of cars with automatic couplings;

d) The construction of great new railroad lines: the Baikal-Amur trunk line, the Akmolinsk-Kartaly, Moscow-Donetz Basin, Karaganda-Balkhash, Ufa-Magnitnaya and other lines which will increase the total length of the railroad system from 83,000 km. on January 1, 1933, to 94,000 km. on January 1, 1938.

e) In *waterway transportation*: gigantic construction of artificial waterways must be carried out—canals: White Sea-Baltic Canal having a length of 227 km. (first section completed during the first year of the Second Five-Year Plan period); Moscow-Volga Canal having a length of 127 km.; Volga-Don Canal having a length of 100 km.; the reconstruction of the Mariinsk and the Moscow River waterway systems, which, together with the great amount of hydro-technical work to be done on the existing waterways (through route along the Dnieper, lock system for the Sozh River, reconstruction of the Middle Volga) will in the main guarantee the reconstruction of the waterways and the creation of a unified waterway system for the European part of the U.S.S.R., connecting the White, Baltic, Black and Caspian Seas. The length of navigable routes must grow during the Second Five-Year Plan period from 84,000 km. to 101,000 km. with a considerable improvement in navigation conditions on these routes. The maritime and river fleets must be radically renewed and reconstructed and low-draught vessels must be built in greater number to utilize shallow rivers.

f) In *motor haulage* the total number of motor vehicles must

rise from 75,000 on January 1, 1933, to 580,000 on January 1, 1938, or almost 8-fold; the construction of dirt roads and paved highways must be extensively carried on, the lack of roads must be overcome in the main so that the total mileage of roads in the country will be increased by 210,000 km. without including the considerable road construction that is being carried on by local resources;

g) In *civil aviation* the network of air lines of Union-wide importance during the Second Five-Year Plan period must grow from 32,000 km. to 85,000 km., *i.e.*, an almost 3-fold increase. Parallel with this, broad construction of local air lines must be developed, bringing their total length in operation up to 35,000 km. in 1937;

h) Decisive advances must be scored in mechanizing *loading and unloading* operations in transportation by increasing the mechanization of railroad transportation 3-fold (from 18 to 57 per cent); of maritime—from 14 to 72 per cent and river transportation—from 12 to 56 per cent, *i.e.*, about 5-fold;

i) The Congress emphasizes the necessity of greatly developing communication of every description, especially *radio* communication, and of radically improving the service.

9. In accordance with the considerable rise in the material and technical base of transportation and the creation of great possibilities for the growth of labour productivity, the Congress sets the growth of labour productivity in railroad transportation during the Second Five-Year Plan period at 43 per cent; in waterway transportation—at 86 per cent, with a reduction in production costs as a whole throughout transportation by 40 per cent—10.5 per cent in railroad, 36 per cent in waterway and 54 per cent in truck transportation.

10. The *training of skilled workers, technicians, and engineers,* the solution of the problem of creating a proletarian technical intelligentsia, constitutes a decisive condition for the realization of technical reconstruction, of the mastery of technique and the fulfilment of the tasks assigned with regard to labour productivity. Accordingly the Congress sets the following program for the preparation of cadres during the Second Five-Year Plan period:

a) The training of 5,000,000 workers in mass vocational schools, of which 2,500,000 persons are being prepared in factory vocational schools, more than 1,500,000 persons in agricultural schools and courses (tractor drivers, brigade leaders and others) and 700,000 persons in schools and courses for chauffeurs;

b) The graduation during the Second Five-Year Plan period of 340,000 specialists from universities, as against 170,700 during the First Five-Year Plan period, or a 2-fold increase; and of 850,000 specialists from middle technical schools as against 308,000 in the First Five-Year Plan period, or a 3-fold increase;

c) The growth in the number of graduate specialists in all branches of national economy from 2,737,200 to 4,009,900, or an increase of 46.5 per cent, including an increase in the number of specialists in industry by 57 per cent, in transportation and communication—by 60 per cent and a doubling of the number of those in agriculture.

11. The Congress points to the necessity of developing as widely as possible the work of the scientific and technical institutes, especially of the factory laboratories. Scientific, technical and inventive thought must become a powerful weapon in the application of the new technique, in the organization of new kinds of manufactures, of new methods of utilizing raw material and power.

II. *The Program of New Construction During the Second Five-Year Plan Period*

12. The completion of the technical reconstruction of national economy and the projected extent of the production tasks for industry, agriculture and transportation require the realization during the Second Five-Year Plan period of a tremendous construction program.

The Seventeenth Congress of the C.P.S.U. approves the *program of construction* during the Second Five-Year Plan period worked out by the State Planning Commission, and fixes the total value of construction in national economy during the Second Five-Year Plan period at 133,400,000,000 rubles (in 1933 prices), as against 50,500,000,000 rubles for the First Five-Year Plan period, of which:

a) In industry—69,500,000,000 rubles as against 25,000,000,000 rubles during the First Five-Year Plan period, of which for industry producing means of production—53,400,000,000 rubles as against 21,300,000,000 rubles, or a 2.5-fold increase; for industry producing manufactured articles of consumption—16,100,000,000 rubles as against 3,500,000,000 rubles, or a 4.6-fold increase;

b) In agriculture—15,200,000,000 rubles as against 9,700,000,000 rubles during the First Five-Year Plan period, or a more than 1.5-fold increase;

c) In transportation—26,300,000,000 rubles as against 8,900,000,000 rubles, or a 3-fold increase.

The Congress notes that the great increase in construction specified for light industry, the food industry and transportation, in comparison with other branches of national economy, ensures a more rapid tempo of their development.

13. The Congress sets the value of new and reconstructed enterprises to be put into operation during the Second Five-Year Plan period at 132,000,000,000 rubles as against 38,600,000,000 rubles during the First Five-Year Plan period, of which: in industry—69,100,000,000 rubles as against 15,700,000,000 rubles, in agriculture—15,400,000,000 rubles as against 9,200,000,000 rubles and in transportation—25,600,000,000 rubles as against 7,700,000,000 rubles.

14. The volume of construction set and the program of the putting into operation of new and reconstructed enterprises guarantee the gigantic growth of the *industrial* and *technical might* of the Soviet Union, and the formation of the necessary capacity reserves in the most important branches of national economy, *viz.*:

a) The total amount of fixed capital during the Five-Year Plan period is rising from 85,000,000,000 rubles to 195,000,000,000 rubles (in 1933 prices), which signifies a 2.3-fold increase, including an increase in industry of from 25,500,000,000 rubles to 77,000,000,000 rubles, in agriculture—from 11,400,000,000 rubles to 22,600,000,000 rubles, and in transportation—from 19,800,000,000 rubles to 38,500,000,000 rubles;

b) In the most important branches of industry the production capacity must grow as follows: in the iron and steel industry (pig iron)—2.3-fold, in the coal industry—more than 2-fold, in the manufacture of generators—2.4-fold, in the automobile industry—almost 4-fold, in the manufacture of locomotives—3.2-fold, in railroad-car building—3.9-fold, in regional electric power stations—2.5-fold, in the footwear industry—2-fold, in the cotton-goods industry—1.5-fold, in the linen-goods industry—more than 2-fold, in the sugar industry—1.5-fold, in large meat-packing plants—2.5-fold.

15. The Congress considers it necessary to concentrate special attention on the following important construction jobs:

In the *machinery industry*—the completion of the following works, the construction of which was commenced during the First Five-Year Plan period: the Ural Heavy Machinery Works,

having a capacity of 100,000 tons; the Kramatorsk Works with an output of 150,000 tons; the Chemical Equipment Works in the Urals; the Lugansk Locomotive Works with a capacity of 1,080 type "FD" locomotives a year; the Orsk Steam and Diesel Locomotive Works with an output of 500 steam and 500 Diesel locomotives a year; the Kashira Electric Locomotive Works with an output of 300 trunk-line electric locomotives; the Ural Railroad-Car Manufacturing Works with an output of 54,000 4-axle cars; the Kuznetsk and Irkutsk Railroad-Car Manufacturing Works with a capacity of 10,000 4-axle cars each; the motor works in Ufa producing 50,000 motors; the Kharkov Turbine-Generator Works producing equipment having an aggregate capacity of 1,500,000 kw.; the expansion of the Gorky Automobile Plant to 300,000 cars; the Stalin Automobile Plant in Moscow—up to 80,000 cars; the Yaroslavl Plant—up to 25,000 five-ton trucks, etc.; the construction during the Second Five-Year Plan period of the Ufa and the Stalingrad Automobile Plants with a capacity of 100,000 three-ton trucks each; the Samara Plant—output 25,000 five-ton trucks; factories manufacturing grinding, radial drilling, gear-cutting, automatic and heavy machine-tools, a new powerful ball-bearing plant with an output of 24,000,000 bearings; the Ural Electric Apparatus and Transformer Works; the construction of a group of works manufacturing textile machines, equipment for the food industry, etc.

In the field of *electrification*—the construction of 79 regional power stations which number includes the completion of the construction of the Zuyevka Power Station, capacity 250,000 kw.; of the Gorky Station—204,000 kw.; Shatura—180,000 kw.; Dubrovka —100,000 kw.; the Svir Hydro-electric Power Station No. 3—96,000 kw.; the completion of the Dnieper State Regional Power Station—capacity 558,000 kw.; the erection of a number of new large central electric power stations: Stalinogorsk—400,000 kw.; Kemerovo—148,000 kw.; of new powerful stations in the Donetz Basin; of the Chirchik No. 1 Hydro-electric Power Station—170,000 kw.; Kanakirsk—88,000 kw.; on the Khram River—60,000 kw.; Svir No. 2—144,000 kw.; Tuloma and others; the development of the construction of the Middle Volga power stations: Yaroslavl—100,000 kw.; Perm—310,000 kw., and Gorky—200,000 kw.; the erection of a number of large central heat-and-power stations for urban use: the Moscow-Narva and Okhta Stations in Leningrad; the Stalin and Frunze Stations in Moscow, the Sormovo-Kanavino Station, the Krassnozavodsk Station in Kharkov and

others; of a number of large factory electric power stations of regional importance: Magnitogorsk—198,000 kw.; Kuznetsk—108,000 kw. and others.

In the *coal industry*—the development of large-scale pit sinking and the putting into operation of 178 pits with a capacity output of 143,000,000 tons of coal.

In the *oil industry*—the construction of a new group of oil refineries (46 tube stills for primary distillation and 93 cracking plants); the laying of oil and oil-products pipe lines for a length of more than 4,000 km.

The development of construction in the *peat and oil shale* industries.

In the *iron and steel industry*—the completion of the construction of the Magnitogorsk Works, capacity—2,700,000 tons of pig iron; of the Kuznetsk, Zaporozhye, Nizhni Tagil, Azov Steel, Krivoy Rog, Lipetsk, Tula and other plants; the development of the construction and the starting of the first machine units of the Bakal and Khalilovo Works, of the second Kuznetsk and Far East Works, of pipe-rolling mills and others.

In the *non-ferrous metals industry*—the Balkhash Copper Combination, capacity—100,000 tons and the Middle Ural combination—50,000 tons; to complete the construction of the Kazakstan Polymetal Works—60,000 tons of lead; of the zinc works in the cities of Chelyabinsk and Orjonikidze; the Altai Polymetal Works, the Kemerovo Works and others; the completion of the construction of the Volkhov and Dnieper Aluminium Works; the construction of the new Ural Aluminium Works—25,000 tons and of the Karelian Works—8,000 tons; the construction of magnesium, nickel and other undertakings of the non-ferrous metals industry.

In the field of the *chemical industry*—the construction of new fertilizer combinations, of synthetic rubber, soda, sulphuric acid, rubber, plastics, aniline, lacquer and dye, artificial fibre and other works.

In *light industry*—the construction of 15 big cotton goods enterprises, including the Tashkent, Barnaul, Khojent, Charjui and Transcaucasian Cotton Goods Combinatons with a capacity of 200,000 spindles each; the construction of 12 big woollen mills with a capacity of from 8,000,000 to 15,000,000 metres of woven cloth each; 12 linen-goods mills with a capacity of from 18,000 to 27,000 spindles each; 18 big knitting mills, 11 silk mills, 21 shoe factories with a capacity of 100,000,000 pairs.

In the *food industry*—the completion of the construction of 17 meat-packing plants commenced during the First Five-Year Plan period and the development of the construction of 23 meat-packing plants; the construction of a great number of sugar refineries, 6 soap factories, a great increase of the fleet in the fish industry, the construction of canneries, vegetable-oil factories, candy factories, etc.

In the *timber industry*—the construction of a great number of saw-mills, wood-chemical enterprises and others, the completion of the construction of the Kama and Kondopoga Cellulose Paper Combinations, of the Syass Cellulose Combination, the construction of the Bashkir and Krassnoyarsk Paper Combinations, etc.

The vast construction and reconstruction of thousands of enterprises in *local industry* to produce commodities of general consumption in which up to 2,000,000,000 rubles will be invested during the Five-Year Plan period.

In *city building*—great progress in transforming hundreds of industrial centres into well laid-out cities; the building of thousands of dwelling houses with apartments equipped with all conveniences representing a total housing space of 64,000,000 sq. metres; the development of city planning, the improvement of urban transportation, water supply, sewerage, street paving, greenery planting, etcetera; the construction of Houses of Soviets, Houses of Technique, Parks of Culture and Rest, stadiums, theatres, clubs, motion picture houses, the construction in Moscow of the Palace of Soviets and of the first subway in the U.S.S.R., the first line of which is scheduled to run in 1934.

16. The specified program of large-scale development of new construction involves decided shifts in the *geographic distribution of the forces of production*:

a) By developing the old industrial centres, new points of support of industrialization in the eastern districts (the Urals, West and East Siberia, Bashkiria, the Far Eastern Territory, Kazakstan and Central Asia) are being created; machinery production, metal manufacturing, coal, oil, electric power production and other branches of industry are being intensively developed. Almost half of all capital investments made in new construction of heavy industry go to the *eastern* districts. In 1937 the eastern districts will supply one-third of the pig-iron output as against one-fourth in 1932; more than one-third of the coal output as against one-fourth in 1932; about one-fifth of the electric power output (of regional

electric power stations) as against 6.5 per cent in 1932; one-tenth of the machinery output as against 5 per cent in 1932.

b) The completion of the construction of the *second coal and iron base* of the Union—the Ural-Kuznetsk Combination—in the construction of which about one-fourth of the capital investment in the national economy of the U.S.S.R. and more than one-third of all capital investments in heavy industry will be placed during the Second Five-Year Plan period. The Ural-Kuznetsk Combination must produce in 1937: one-third of the output of the iron and steel industry, more than one-fourth of the total coal output of the country, one-sixth of the electric power output from regional electrict power stations and about 10 per cent of the machinery manufactured.

c) *The bringing of industry nearer to the sources of raw material* on the basis of developing new districts. The realization of great shifts in the geographic distribution of light industry and the food industry: of the 15 cotton combinations being built during the Second Five-Year Plan period, 10 are assigned for construction in Central Asia, Siberia and Transcaucasia, which involves a 16-fold growth of production of cotton goods in Central Asia while the average growth in the Soviet Union is 2-fold, and creates a solid textile manufacturing base in these districts. In the linen industry great processing bases are being established in the Western Region, in the Gorky Territory and in the White Russian Socialist Soviet Republic. New raw material bases are being created as a result of which new sugar refineries are being set up (West Siberia, Kirghizia, the Far Eastern Territory, Transcaucasia, etc.). In the principal centres of agricultural raw material production, construction of leather-working and wool-working enterprises, of vegetable-oil factories and other plants of light industry and the food industry is being developed. The increase in local fuel output is assuming great proportions, thus lessening the dependence of a number of districts upon long-haul fuel.

d) In the field of *agriculture*—a considerable growth of grain production in the basic grain districts—the commencement of large-scale irrigation construction in the Trans-Volga district and the creation of a stable wheat base in the central and northern districts; a tremendous increase in the output of industrial crops in the principal districts of their production, accompanied by the creation of a new sugar-beet base in the East; the wide development of new valuable crops, especially in the sub-tropical districts

—all ensure the solution of the task of the proper geographic distribution of the principal branches of agriculture and the specialization of districts by crops and branches.

e) In the field of *transportation*—parallel with the reconstruction and the strengthening of the principal trunk lines running east and south—the construction of a large group of new railroads and waterways linking new industrial centres with the general transportation system of the Union and constituting the basis of economic development of new districts (Karaganda-Balkhash, Ufa-Sterlitamak, Rubtsovka-Ridder, Tomsk-Chulim, the White Sea-Baltic Canal and others).

f) Wide industrial development in such formerly industrially *backward* districts as the Middle Volga Territory, the Tatar Autonomous Socialist Soviet Republic, Northern Caucasus, Central Black Soil Region, Transcaucasia, Karelia, Murmansk Territory, Far Eastern Territory, East Siberia and others on the basis of developing large-scale industry there.

g) The intensive development of construction work in the fields of education, public health, art and printing in the *national republics and regions.*

h) The further growth of the *old industrial districts* of the U.S.S.R on the basis of intensifying the specialization commenced during the First Five-Year Plan period and the more even geographic distribution of industry within the districts.

The Congress points out that the program being laid down for the geographic distribution of the productive forces during the Second Five-Year Plan period ensures that the economic and cultural backwardness of the national republics and regions will be overcome, that there will be a more even geographic distribution of the productive forces and an approximation of industry to the sources of raw material, a specialization of the principal districts according to agricultural crops and branches and the completion of the division of the country as a whole into economic districts.

III. *The Program of Raising the Material and Cultural Level of the Workers and Peasants*

The abolition of unemployment and the assurance of work for all workers and employees with an improvement in their working conditions systematically carried out in the Soviet Union, the reduction of the working day to seven hours and the presence of

favourable conditions for raising their production skill and their general cultural level enable the entire mass of workers and employees, by steadily raising their labour productivity, to march forward with greater strides along the path of improving their material well-being.

The completion in the course of the Second Five-Year Plan period of the collectivization of the entire mass of peasant farms, the abolition of the kulaks as a class and the suppression of each and every attempt at resistance made by them, the cessation of the differentiation of the peasantry into possessing and non-possessing peasants and the abolition of destitution and pauperism in the rural districts incident thereto, coupled with the steadfast organizational and economic consolidation of the collective farms and the rapid growth of their machine and technical bases, create the necessary favourable prerequisites for a rapid improvement in the material conditions of the collective farmer masses and the attainment of a cultured and well-to-do life by the peasants, and make the tempo of this rise directly dependent upon the degree of organization and the labour productivity of the collective farmers themselves.

Approving accordingly the draft of the State Planning Commission, the Congress sets the following tasks in the field of raising the standard of living and cultural level of the workers and toilers in the rural districts:

1. a) A 26 per cent increase in the *number of workers and employees* by the end of the Second Five-Year Plan period in all branches of national economy, including a 29 per cent increase in large-scale industry;

b) A 2-fold rise in *real wages* on the basis of the final elimination of parasitic consumption, of the rapid growth of the national income, of a 2.5-fold increase in the standards of consumption of products such as meat, fats, fish, eggs, sugar and manufactured goods, a 35 per cent reduction in retail prices and a further improvement in the living conditions of the toilers;

c) A 55 per cent rise in the *wages fund* of the workers and employees in the whole of national economy, including a 64 per cent rise in large-scale industry;

d) A considerable increase in State expenditures on *cultural and social services* for the workers, *i.e.*, expenditures for social insurance and State outlays for education, health protection and the cultural and social services for the workers and employees—of

from 4,300,000,000 rubles to 9,300,000,000 rubles—a more than 2-fold increase for the Five-Year Plan period;

e) A 2.5-fold growth in the number of workers and toilers in town and country served by *public catering*;

f) The completion during the Second Five-Year Plan period not only of the abolition of illiteracy of the population of the Union, of the abolition of the semi-literacy of the able-bodied adult population, and the completion of the institution of universal compulsory elementary education, but also of the realization of *universal compulsory polytechnic education* in seven-year courses, primarily in rural districts, inasmuch as in the cities this task was in the main already accomplished in the course of the First Five-Year Plan period; the growth in the number of students (in primary and secondary schools, workers' colleges, factory vocational schools, middle technical schools, colleges and technical colleges) up to 36,000,000 persons as against 24,200,000 in 1932 or up to 197 persons per thousand of the population as against 147 persons, exclusive of pre-school education which in 1932 already counted 5,200,000 pupils;

g) A vast development of *extra-school* mass education, closely interlinked with the organized cultural rest of the toiling masses, an increase in the number of clubs in town and country of up to 10,900 as against 6,800 (an increase in the cities of 10.5 per cent and in rural places by 130 per cent) and of the number of public libraries up to 25,000 as against 15,000 in 1932;

h) A further considerable extension of *health-protection* provisions for the toilers, primarily the vast introduction of sanitary and prophylactic measures, an increase in appropriations for health protection, workers' rest and physical culture from 5,400,000,000 rubles in the First Five-Year Plan period to 19,600,000,000 rubles.

An increase in the number of hospital beds in the cities amounting to 44 per cent, in rural communities amounting to 98 per cent; an increase of 164 per cent in crèche accomodations in the cities and of 129 per cent in rural communities.

i) An increase during the Five-Year Plan period in the number of cities with water-works—from 366 to 440; in the number of cities with sewage systems—from 55 to 125; of cities with street cars—from 50 to 70;

j) Accordingly to set the extent of capital investments in construction for municipal, housing and cultural purposes during the

Second Five-Year Plan period at about 32,000,000,000 rubles, or about one-fourth of all capital investments in national economy, including 13,400,000,000 rubles for housing construction, 6,200,000,000 rubles for municipal construction in cities, 3,100,000,000 rubles for education and 2,900,000,000 rubles for public health.

2. The task of raising the material standard of living of the workers and peasants demands the maximum *development of commodity circulation* based on increasing the output of industrial commodities of general consumption and on improving the supply of the cities with agricultural products.

The Congress accordingly specifies:

a) A 2.5-fold rise in commodity circulation—from 31,900,000,000 rubles in 1932 to 80,000,000,000 rubles in 1937 (in 1932 prices) with a 2.5-fold increase in the output of manufactured articles of general consumption produced by light industry and the food industry;

b) A 37 per cent increase in the retail State and co-operative trading system and its simultaneous technical reconstruction;

c) A 35 per cent reduction in the average level of retail prices as compared with 1933.

3. The Congress sets the rise of the *national income* at from 45,500,000,000 rubles to 100,000,000,000 rubles, or a 2.2-fold increase, and a 2.4-fold increase in the volume of consumption in national economy with a simultaneous tremendous increase of accumulation in socialized economy and a growth of State reserves.

The Congress emphasizes that the struggle for the application of cost accounting in all departments of national economy, strict adherence to financial plans, the further consolidation of the Soviet ruble—this most important lever for strengthening cost accounting and reinforcing the economic relations between town and country—must be made the basis of economic activity.

* * *

The Seventeenth Congress of the C.P.S.U. places on record that the Second Five-Year Plan of development of national economy submitted by the State Planning Commission of the U.S.S.R. and adopted by the Central Committee of the C.P.S.U. and by the Council of People's Commissars of the Union of Soviet Socialist Republics ensures:

a) The abolition of capitalist elements and of classes in general,

the final abolition of the private ownership of the means of production on the basis of the full completion of collectivization of peasant holdings and the inclusion of all artisans in co-operative organizations, the abolition of the multiplicity of socio-economic systems in the Soviet Union and the establishment of the socialist mode of production as the only mode of production, together with the transformation of the entire toiling population of the country into active, conscious builders of socialist society;

b) The completion, on the basis created during the First Five-Year Plan period, of technical reconstruction which is advancing along the road of the further rapid rise of industry producing means of production (heavy industry);

c) A more rapid improvement in the well-being of the worker and peasant masses together with a decided improvement in housing and municipal services in the U.S.S.R.;

d) The entrenchment of the economic and political positions of the proletarian dictatorship on the basis of the alliance between the working class and the peasantry for the final abolition of capitalist elements and of classes in general;

e) The further reinforcement of the defensive strength of the country.

The realization of these tasks, which leads to the forcing out of the last remnants of the capitalist elements from all their old positions and dooms them to final extinction, cannot but call forth a sharpening of the class struggle, new attempts by the rich peasants to undermine the work of the collective farms, attempts at wrecking and the sabotage of our industrial enterprises by anti-Soviet forces. On the other hand the realization of the tasks of the Second Five-Year Plan period, the five-year period of a radical rise in the standard of living of the workers and peasant masses on the basis of the completion of the technical reconstruction of the whole of national economy, cannot but call forth the enthusiasm of the toilers, a high tide of productional activity and a growing aspiration among the broadest masses of the toilers—the builders of socialism—to master the new technique.

By mercilessly routing the counter-revolutionary attacks of the class enemy and by welding together the ranks of the shock brigade workers of socialism for the victorious completion of the Second Five-Year Plan, the working class jointly with the collective farmer masses, under the leadership of the Communist Party which is waging a steadfast struggle against every kind of

opportunism, will overcome every manner of difficulty on the road to the construction of socialism.

The Seventeenth Congress of the C.P.S.U. points out that the consummation of the Second Five-Year Plan, the plan of the general technical reconstruction of national economy, demands that matters be organized in such a way as to ensure:

First, the operative and concrete character of day-to-day management in economic life, with no tolerance of bureaucratic distortions in the economic apparatus;

Second, the concentration of the best engineering and technical forces at the decisive production sectors, not in the offices;

Third, the proper regulation of workers' wages, thereby ensuring a material incentive for the growth of labour productivity;

Fourth, the raising of socialist competition to a higher plane, so that the new technique and the new processes of production may be more effectively mastered.

Fifth, strict production discipline at industrial enterprises as well as on State and collective farms;

Sixth, revolutionary vigilance against the enemies of the dictatorship of the proletariat and real responsibility to the working class and its Party for all matters entrusted;

Seventh, the further consolidation of the alliance between the workers and the toiling peasants.

During the Second Five-Year Plan period the U.S.S.R. is making gigantic strides towards abolishing the age-old contrast in human society—the contrast between town and country—and is creating all necessary preconditions for its elimination. As regards social form, agriculture is becoming uniform in character with industry, agricultural labour is being transformed into a variety of industrial labour, transportation connections between town and country are multiplying greatly, the rates of growth of output of industry and agriculture approximate each other to a considerable extent, the material well-being and culture of the toilers of town and country approach a common level.

The U.S.S.R. is being transformed during the Second Five-Year Plan period into a technically and economically independent country and into the most advanced country of Europe in point of technique.

The fulfilment of the Second Five-Year Plan will increase still further the importance of the U.S.S.R. as a bulwark of struggle of the international working class, will raise the prestige of the

Land of the Soviets as a base of support of the world proletarian revolution still higher in the eyes of the toiling exploited masses of the whole world. The new great historic victories in the construction of socialism will consolidate still more the economic basis of the fighting capacity of the Soviet Union, its ability to repel and smash any encroachment by the enemies of the proletarian State. The powerful economic upsurge and steady growth of the well-being of the toiling masses in the Soviet Union, while a crisis exists in the capitalist countries, will still more strikingly corroborate the superiority of the socialist system of economy over the capitalist system and the historical doom of the system of capitalist slavery, will make still more conspicuous the gigantic creative forces of the revolutionary proletariat, which has conquered power and is consolidating its dictatorship in a heroic struggle for the building of classless, socialist society.

The Seventeenth Congress of the C.P.S.U. demands of all members of the Party a Bolshevik struggle for the victory of the Second Five-Year Plan and calls upon the workers and the collective farmers to rally around the Party for the consummation of this epoch-making task.

DECREE OF THE CENTRAL EXECUTIVE COMMITTEE AND THE COUNCIL OF PEOPLE'S COMMISSARS OF THE U.S.S.R. CONCERNING THE SECOND FIVE-YEAR PLAN FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R. (1933-37).

THE Central Executive Committee and the Council of People's Commissars of the U.S.S.R. *decree:*

To confirm the plan of development of national economy for the Second Five-Year Plan period (1933-37) submitted by the State Planning Commission of the U.S.S.R.

I. *Industry*

1. To fix the total gross volume of output of all *industry* for 1937 at 92,700,000,000 rubles in 1926-27 prices, which constitutes 214.1 per cent of the total in 1932 (the average annual increase being 16.5 per cent). Herein comprised are the industries producing means of production—45,500,000,000 rubles or 197.2 per cent of 1932 (the average annual increase being 14.5 per cent), and the industries producing articles of consumption—47,200,000,000 rubles or 233.6 per cent of 1932 (the average annual increase being 18.5 per cent).

To set the following gross volume of output in 1937 for the industrial People's Commissariats (in 1926-27 prices):

P. C. of Heavy Industry	33,500,000,000	rubles
P. C. of Timber	3,600,000,000	"
P. C. of Light Industry	19,500,000,000	"
Food Industry under the P. C.'s of the Food Industry and of Domestic Trade	11,900,000,000	"

To fix the gross volume of output of the handicraft co-operative organizations in 1937 at 11,590,000,000 rubles (in 1932 prices) which constitutes 203.5 per cent of the total in 1932.

2. To confirm the following quotas for 1937 to be produced by the most important branches of industry:

1. All metal products (in 1926-27 prices) . .	19,500,000,000	rubles
of which:		
a) Metal-working machines	40,000	units
b) Tractors (in standard 15 h.p. equivalents	167,000	"
c) Locomotives (freight and passenger, in standard "E" and "SU" equivalents) .	2,800	"

d) Freight cars (in 2-axle equivalents)	118,400	units
e) Motor vehicles	200,000	"
f) Metal products for general consumption manufactured under the control of the P. C. of Heavy Industry (in 1932 prices)	1,430,000,000	rubles
2. Generation of Electricity	38,000,000,000	kwh.
of which:		
Regional stations under the Chief Power Board	24,500,000,000	"
3. Coal	152,500,000	tons
4. Oil	46,800,000	"
5. Pig iron	16,000,000	"
6. Steel	17,000,000	"
7. Rolled Steel	13,000,000	"
of which:		
Special rolled steel	2,000,000	"
8. Railroad rails, first grade	1,300,000	"
9. Copper	135,000	"
10. Aluminium	80,000	"
11. Chemicals (in 1926-27 prices)	5,500,000,000	rubles
12. Timber and woodworking products	5,888,000,000	"
13. Logging-camp products	170,000,000	m^3
14. Saw-mill products	43,000,000	"
15. Cotton goods	5,100,000,000	metres
16. Woollen goods	220,000,000	metres
17. Linen goods	600,000,000	m^2
18. Leather footwear	180,000,000	pairs
19. Soap	1,000,000	tons
20. Sugar (granulated)	2,500,000	"
21. Fish (catch)	1,800,000	"
22. Meat (produced under the control of the P. C. of the Food Industry)	1,200,000	"
23. Canned goods (produced under the control of the P. C. of the Food Industry)	2,000,000,000	cans

To set the total volume of articles of general consumption to be manufactured by local industry in 1937 (in 1926-27 prices) at 3,300,000,000 rubles, a 3-fold increase in comparison with the end of the First Five-Year Plan period.

3. For the purpose of *completing the technical reconstruction* of industry:

a) To *build* new enterprises and reconstruct old enterprises during the Second Five-Year Plan period to such an extent that by the end of these five years 80 per cent of the total output of industry will be supplied by new enterprises, or enterprises completely reconstructed during the First or the Second Five-Year Plan period;

b) To strive to complete in the main by the end of the Second Five-Year Plan period the *mechanization* of all laborious and arduous processes in industry (particularly the iron and steel, coal mining, peat, building, local building materials and lumber industries);

c) In the *machinery industry,* the foremost link in technical reconstruction, to adopt a program which shall provide for a sufficiently great increase in the output of all kinds of equipment to ensure that all equipment requirements of national economy will be satisfied by the domestic output of machinery;

In the field of machinery production under the Second Five-Year Plan, special attention must be paid to the manufacture of equipment for the metallurgical, food and light industries as well as equipment for road-building, and dwelling house as well as municipal construction, in addition to the manufacture of machine-tools, transportation equipment, tractors and agricultural machines;

d) In *electrification*—to complete in the main the electrification of industry and widely develop the lines of production requiring large quantities of electric current (especially the electro-chemical and electro-thermic industries). A 9-fold increase in power consumption by these branches of manufacture must be provided for. Development of electrification in the transportation system and the gradual introduction of electricity in agriculture must be given broad scope. Provision must be made to augment the capacities of the regional heat-and-power plants 8.9-fold, to increase the proportion of electric power generated by hydro-electric stations from 7.3 per cent to 19.5 per cent, to interlink stations and employ high voltage in networks, to create huge electric power systems in all the main industrial districts and form reserve capacities in all power networks;

e) In the *fuel industry*—to mechanize coal mining 93 per cent by the end of the Second Five-Year Plan period; gathering—90 per cent, hauling—80 per cent and loading—20 per cent. To accelerate the mining of sintering and other kinds of coal for coking, and effect a considerable improvement in the quality of coal (lowering ash and sulphur content); to mechanize peat extraction 72 per cent by the end of the five-year period; to develop the gasification of peat and oil shale. In oil extraction to attain a 2.8-fold increase in boring speed, to master the technique of deep boring and increase the percentage of turbine boring from 2.6 to 12; in

oil refining to increase the proportion of cracking gasoline obtained from crude oil to 25 per cent. Of particular importance to national economy is the task of developing oil and coal production in the new districts (Moscow Basin, Urals, Bureya District of the Far Eastern Territory, East Siberia, Central Asia, etc.) as well as the mining of local fuel like peat and oil shale;

f) In the *iron and steel industry*—to overcome the lag of the iron and steel industry behind the general rate of development of national economy; to ensure that national economy be fully supplied with the various types of metal, particularly special steel, complex shapes of rolled metal and iron pipes. For this purpose, to overcome the lag of the capacities of the rolling mills and steel smelting departments behind the capacities of the blast furnaces, to develop the output of electric steel and of ferro-alloys and devote particular attention to the construction and reconstruction of works producing special steel as well as to measures calculated to raise the quality of the metal; to raise considerably the use factor of the equipment and strive for a sharp reduction in the rate of consumption of fuel per unit of output.

To introduce the processes of ore concentration and agglomeration extensively in the iron ore industry and to begin the utilization of complex ores;

g) In the *non-ferrous smelting industry*—to develop the extraction of copper, lead, zinc and aluminium to an extent sufficient to cover fully the needs of national economy, while extensively applying the modern processes for obtaining non-ferrous metals such as flotation and reverberatory furnace smelting. To increase the proportion of zinc obtained by the electrolytic process to 70 per cent; to set up the manufacture of nickel, magnesium and tin, and to increase the output of rare metals. To develop the output of new types of cable required in electrification and communication as well as the manufacture of bi-metallic products to promote economies in the use of non-ferrous metals;

h) In the *chemical industry*—to introduce the latest and most advanced technological processes (electro-chemical and electro-thermic processes, the tower system in the manufacture of sulphuric acid, the utilization of bio-chemical processes, reactions in gaseous phases and so forth). To develop the combining of the chemical industry with the iron and steel industry, with the production of coke, the refining of oil and the smelting of non-ferrous metals. To effect a 10-fold increase in the output of fertilizers for

agriculture, shifting simultaneously to new types of concentrated fertilizers (double superphosphates, mono-ammonium phosphate, etc.); to develop the manufacture of new types of chemical products—fuel chemistry, the manufacture of products of organic synthesis such as organic dyes, plastic materials, new types of solvents and lacquers, the mass production of synthetic rubber, the hydrolysis of wood pulp (obtaining alcohol from sawdust) and so forth;

i) In the *timber industry*—to develop the mechanization of timber hauling so that the proportion of timber hauled by mechanical means and over improved roads will constitute 63 per cent of the total timber hauled; to open up the forest expanses of the North and the East on an extensive scale during the Second Five-Year Plan period; to enlarge the scope for building saw-mills in combination with planing mills, etc.; to develop wood-chemical manufacturing at an especially rapid rate;

j) In *light industry*—extensively to mechanize the processes of production and render them automatic on the basis of large-scale machine production. To increase the proportion of automatic machines in the cotton industry by the end of the Second Five-Year Plan period from 10.6 per cent to 40 per cent of the total number of looms and to replace the obsolete spinning machines by modern equipment.

In the linen industry—to increase the proportion of high-speed spindles and to reconstruct radically the primary working up of flax; to mechanize the knit-goods, needle-trades and footwear industries on a vast scale. Considerably to improve the coefficient of utilization of raw material and the rational use of substitutes;

k) In the *food industry*—to ensure the transformation of the food industry into a technically advanced industry of national economy; to complete in the main the transition from primitive slaughter houses in the meat industry to meat-packing plants, so that the output of the latter shall constitute 75 per cent of the meats produced by the meat industry by the end of the Second Five-Year Plan period. In the State fisheries, to raise the proportion of mechanized catch to 70 per cent. In vegetable oil manufacturing to introduce the most effective process, *i.e.*, extraction. To complete in the main the mechanization of bread baking and develop the construction of automatic bread factories.

4. The universal *mastery of the new technique* represents the decisive condition upon which the completion of the technical re-

construction of industry during the Second Five-Year Plan period depends. Accordingly the qualitative index figures must assume much greater importance during the years of the Second Five-Year Plan period: the increase in *labour productivity* must become a decisive factor in fulfilling the scheduled rise in the output of industry, while the *lowering of costs of production* must be made an important factor in the fulfilment of the plan of capital investments.

To set a 63 per cent increase in the productivity of labour in industry during the Second Five-Year Plan period, this to include 75 per cent for heavy industry, 52 per cent for light industry, 60 per cent for the timber industry and 60 per cent for the food industry. To lower the cost of production in industry during the Second Five-Year Plan period by 26 per cent.

In view of the special importance of quality and assortment of output for the fulfilment of the production and construction plan and the improvement of the material welfare of the toilers, the Central Executive Committee and the Council of People's Commissars of the U.S.S.R. make it binding upon all economic organizations to effect a decided improvement in the quality of the means of production (coal, metal, machinery, chemicals and so forth), in the quality and assortment of products intended for personal consumption (woven goods, clothing, footwear, meat, dairy and fish products and so forth), so as to be able to meet the rising material and cultural demands of the toiling masses.

II. *Agriculture*

1. To *double* the volume of agricultural output during the Second Five-Year Plan period in comparison with the level of 1932, *i.e.*, to raise its value from 13,100,000,000 rubles (in 1926-27 prices) to 26,200,000,000 rubles, inclusive of a 2.25-fold increase in stock-raising.

2. To confirm the following totals for the gross output of *grain and industrial crops* for the end of the Second Five-Year Plan period: grain crops—1,048,000,000 centners, cotton fibre—7,000,000 centners, flax fibre—8,000,000 centners, sugar beet—276,000,000 centners.

3. To set the gross output of meats and edible fats by the end of the Second Five-Year Plan period at 50,900,000 centners as against 23,000,000 centners in 1932, of milk—324,600,000 centners as

against 202,300,000 centners, of wool—1,600,000 centners as against 690,000 centners.

4. Considering the rise in the qualitative index figures based on the organizational and economic consolidation of the State and collective farms to be the central task of agriculture during the Second Five-Year Plan period, to confirm the following specifications governing the yield per hectare at the end of this period: for grain crops—10 centners, for irrigated unginned cotton—12 centners, for long fibre flax—3.7 centners, for sugar beet—200 centners. In stock raising—to increase the average weight of cattle on the hoof and to raise wool shearing and milk yield.

5. The tremendous increase in the volume of output and the rise in the qualitative index figures mapped out by the Plan can only be realized by fully completing collectivization and the technical reconstruction of agriculture.

Accordingly:

a) To transform the State farms of all systems into model agricultural enterprises on the basis of mastering the technique of large-scale machine production, of introducing everywhere the latest scientific methods in agriculture and stock breeding, and of increasing the delivery of products to the State with a simultaneous improvement in their quality;

b) To include all collective farms in the machine and tractor station network and for this purpose to increase the number of machine and tractor stations from 2,446 in 1932 to 6,000 in 1937;

c) To set the number of tractors at the disposal of agriculture in 1937 at an equivalent of 8,200,000 h.p. as against 2,225,000 h.p. in 1932; the number of harvester combines—at 100,000, of motor vehicles—at 170,000;

d) To assign the following tasks in the mechanization of the principal processes of agriculture: the mechanization of ploughing, including autumn ploughing, is to reach 80 per cent in 1937 as against 19 per cent in 1932; grain harvesting (by tractor-drawn harvesting machines)—60 per cent in 1937 as against 10 per cent in 1932; the cultivation of fallow land and of row crops (by tractor-drawn cultivators)—70 per cent as against 7 per cent, and of threshing (by mechanical threshers)—85 per cent as against 40 per cent for the same years;

e) To set the following totals for the farming machinery and fertilizers to be supplied to agriculture: farming machinery, tractors and implements will represent a value of 1,460,000,000 rubles

in 1937, while there will be 1,410,000 tons of nitrogen fertilizers as against 22,200 tons in 1932, 3,000,000 tons of phosphate fertilizers as against 614,000 tons, potash fertilizers—1,680,000 tons as against 79,000 tons and powdered phosphorite—2,200,000 tons as against 396,000 tons for the respective years;

f) To set the increase in irrigated area during the Second Five-Year Plan period at 1,000,000 hectares, the additional irrigation work to include the local draining in the Trans-Volga Area of the spring waters of small Volga tributaries.

g) In view of the tremendous importance of scientific measures designed to raise the yield of crops, to institute everywhere correct crop rotations by the end of the Second Five-Year Plan period. To set the area to be sown with selected seed at 75 per cent of the total area under grain crops, and of late autumn ploughing—at 50 per cent of the sowing area.

6. In prescribing accelerated rates of development for *stock-raising* during the Second Five-Year Plan period on the basis of the victory achieved by the collective farm system in the countryside, the Central Executive Committee and the Council of People's Commissars of the U.S.S.R. specially emphasize the fact that the successful solution of this problem requires the firm enforcement of the following measures:

a) Annual State plans must be drawn up for the development of stock-raising. These plans must specify the increase in the number of cattle scheduled for the State farms and collective stock farms. Such plans must also be drawn up for the State and collective farms and the rural Soviets concerning the rearing of young cattle and the production of forage;

b) The State stock farms must be firmly reinforced by complete organizational and economic consolidation. On these farms excessive specialization must be abolished, the breed of cattle improved and their productivity increased, the State farms must be transformed into model agricultural enterprises which will ensure increased output and State aid to the collective stock farms by the sale to them of grown and young cattle;

c) The collective stock farms which play a decisive role in the development of stock-raising during the Second Five-Year Plan period must be consolidated organizationally and economically;

d) Maximum co-operation and practical aid must be extended by all Soviet and economic organs to collective farmers by providing cows for all of them who have none;

e) Pure-bred stock farms must be organized on a mass scale. In districts containing a great number of pure-bred cattle, State pedigreed cattle-breeding stations must be organized for the intensive breeding of select pedigreed stock;

f) The forage base of supply for stock-raising must be reinforced by enlarging the areas sown to grass and edible roots and bulbs, and by raising their yield. The working up of the food industry's waste products must also be organized more extensively;

g) The organization of the veterinary service must be decidedly improved by developing veterinary sectors and stations and supplying them with the requisite quantity of biological preparations, disinfectants, medicaments and veterinary instruments.

III. *Transportation and Communication*

1. To specify such increases in *freight traffic* on the main forms of transportation that the railroads will remain the chief freight carriers during the Second Five-Year Plan period while the importance of waterway and motor transportation will be raised.

Accordingly, to provide that during the Second Five-Year Plan period railroad freight shipments increase from 169,000,000,000 ton-km. to 300,000,000,000 ton-km., an increase of 77.2 per cent; river freight shipments—from 26,100,000,000 ton-km. to 63,000,000,000 ton-km., or an increase of 141.4 per cent; maritime freight shipments in Soviet bottoms—from 18,200,000,000 ton-km. to 51,000,000,000 ton-km., or an increase of 180 per cent; motor haulage—from 1,070,000,000 ton-km. to 16,000,000,000 ton-km., or a 15-fold increase.

2. *To complete the technical reconstruction of the transportation system*, to overcome the lag of the transportation system behind the development of the other branches of national economy. To reconstruct the principal trunk-lines in operation and to build new trunk lines sufficient in extent to connect the new industrial centres with the general transportation network of the U.S.S.R.

3. *In railroad transportation:*

a) *To reconstruct the trackage* of the most important lines and for this purpose to electrify 5,000 km. of railroad lines. To lay second tracks for the length of 9,500 km. (the Ural-Kuznetsk Basin, Transbaikal, Ussuri and Donetz Basin railroads, among others). To equip 8,300 km. of railroad lines with the automatic block signal system. To increase the length of the trackage at railroad junctions and stations by 8,500 km. To replace light rails by

heavy rails for a length of 20,000 km. To carry out a vast program of bridge construction, to strengthen railroads in operation by shifting to the use of road metal ballast, increasing the number of ties, etc.

To construct huge *new railroad lines:* the Baikal-Amur trunk line, the Moscow-Donetz Basin, Akmolinsk-Kartaly, Karaganda-Balkhash, Ufa-Magnitogorsk and other lines which will increase the total length of railroads in operation from 83,300 km. to 94,000 km.;

b) *To reconstruct the rolling stock* of the railroads—to set the total number of railroad locomotives in 1937 at 26,600 as against 19,500 in 1932. Powerful modern engines like the "FD" type of freight locomotive and the "JS" type of passenger locomotive must become the prevalent types of locomotives in the freight and passenger services respectively, while at the same time putting Diesel and electric locomotives into service on a vast scale.

To set the total number of freight cars for the end of the Second Five-Year Plan period (in 2-axle equivalents) at 800,000 as against 552,000 at the end of the First Five-Year Plan period, and the total load capacity of freight cars at 15,800,000 tons as against 9,500,000 tons. At the same time all freight cars are to be equipped by the end of the Second Five-Year Plan period with automatic brakes and not less than half of the freight cars are to be provided with automatic couplings;

c) To extend the *repair shop base* of the railroad system by building 9 car repair shops, 3 locomotive repair shops and 4 railroad equipment plants, and by extensively reconstructing the locomotive and car repair shops under the control of the People's Commissariat of Transportation.

4. *In waterway transportation:*

To fix the length of *navigable waterways* by the end of the Second Five-Year Plan period at 101,000 km. as against 84,000 km. at the end of the First Five-Year Plan period. To construct artificial waterways and carry on hydro-technical work on the waterways in operation to an extent that will ensure the creation of a unified waterway system for the European part of the U.S.S.R. This system is to interconnect the White, Baltic, Black and Caspian Seas (by building the following canals: the White Sea-Baltic Canal, having a total length of 227 km., the first section of which was finished during the first year of the Second Five-Year Plan period; the Moscow-Volga Canal, having a length of 127 km.; the Volga-

Don Canal, having a total length of 100 km.; the reconstruction of the Mariinsk and Moscow River water systems; the through route over the Dnieper, the building of locks on the Sozh River and the reconstruction of the Middle Volga).

5. *In motor haulage:* to set the total number of motor vehicles by the end of the Second Five-Year Plan period at 580,000 as against 75,000 by the end of the First Five-Year Plan period.

To enlarge the country's road system by the addition of 210,000 km. This is to be accomplished by expanding the network of dirt and paved roads and by extensive road building with local resources. This policy ought to ensure the abolition in the main of the country's road shortage.

6. *In civil aviation:* to set the network of airlines of Union-wide importance by the end of the Second Five-Year Plan period at 85,000 km. as against 32,000 km. by the end of the first period.

This is to be paralleled by lengthening local airlines to be operated at the end of the Second Five-Year period to 35,000 km.

7. To assign the following tasks in the mechanization of loading and unloading of shipments: in railroad transportation—57 per cent in 1937 as against 18.3 per cent in 1932; in river transportation —56 per cent as against 12 per cent in 1932, and in maritime transportation—72 per cent as against 14 per cent for the same years.

8. Emphasizing the importance of the rapid development of *communication* during the Second Five-Year Plan period, to assign the following tasks:

a) To increase the length of postal lines throughout the country and raise the proportion of postal routes served by mechanical means of locomotion from 28 per cent in 1932 to 58.5 per cent in 1937;

b) To set the total length of inter-urban wire telephone and telegraph lines by the end of the Second Five-Year Plan period at 3,830,000 km. as against 1,515,000 km. in 1932. Provision is to be made for the more rapid increase in the length of bronze and bimetallic wires which are to be equipped with multiplex high-frequency apparatus for the simultaneous transmission of telephonic and telegraphic messages;

c) To provide that by the end of the Second Five-Year Plan period all rural Soviets be supplied with telephone service, and that not less than 40 per cent of all machine and tractor stations and State farms be equipped with internal telephone service;

d) When reorganizing the communication system from a radial to a junction system, to build at all important junction points radio stations possessing the requisite capacities and equipped with mechanized transmission and receiving apparatus so that radio communication may develop at an especially rapid rate.

9. To set the increase in labour productivity in the railroad transportation system at 43 per cent, in waterway transportation at 86 per cent and in national communication at 43.8 per cent. To set the reduction in the cost of production of railroad transportation at 10.5 per cent, of waterway transportation at 36 per cent and of motor haulage at 54 per cent.

IV. *Construction*

1. For the purpose of realizing the program of technical reconstruction and the fulfilment of the specified production quotas, to set the volume of construction for the whole of national economy during the Second Five-Year Plan period at 133,400,000,000 rubles (in prices of the plan of 1933) as against 50,500,000,000 rubles expended under the First Five-Year Plan, of which:

a) For industry—69,500,000,000 rubles as against 25,000,000,000 rubles, inclusive of: for branches producing means of production—53,400,000,000 rubles as against 21,300,000,000 rubles, or a 2.5-fold increase; for branches producing articles of consumption —16,100,000,000 rubles as against 3,500,000,000 rubles, or a 4.6-fold increase;

b) For agriculture—15,200,000,000 rubles as against 9,700,000,000 rubles under the First Five-Year Plan, or a more than 1.5-fold increase;

c) For transportation—26,300,000,000 rubles as against 8,900,000,000 rubles under the First Five-Year Plan, or a 3-fold increase.

2. In pursuance of the object of further increasing the fixed capital in all branches of national economy and for the purpose of establishing the necessary reserve capacities in production, to set the total fixed capital in the whole of national economy at the end of the Second Five-Year Plan period (in prices of 1933) at 195,000,000,000 rubles as against 85,000,000,000 rubles in 1932, of which: in industry—77,000,000,000 rubles, as against 25,500,000,000 rubles, in agriculture—22,600,000,000 rubles as against 11,400,000,000 rubles, in transportation—38,500,000,000 rubles as against 19,800,000,000 rubles.

3. To set the value of new and reconstructed enterprises to be opened for exploitation during the Second Five-Year Plan period at 132,000,000,000 rubles as against 38,600,000,000 rubles under the First Five-Year Plan, of which: for industry—69,100,000,000 rubles, for agriculture—15,400,000,000 rubles, and for transportation—25,600,000,000 rubles.

4. To fix the following increases in the production capacities of the most important branches of industry during the Second Five-Year Plan period: for regional electric stations—2.5-fold, for the coal industry—2.2-fold, for the iron and steel industry: pig iron—2.3-fold, rolled steel—2.7-fold; for tractor manufacturing—3.5-fold, for the automobile industry—almost 4-fold, for locomotive plants—3.2-fold, for railroad car plants—3.9-fold, for the production of turbo- and hydro-generators—2.1-fold, for the cotton industry—1.5-fold, for the shoe industry—2-fold, for the linen industry—2.2-fold, for the meat industry (big meat-packing plants) —2.5-fold, for the sugar industry—1.5-fold.

5. To build the following major items of construction during the Second Five-Year Plan period:

In the *machinery industry:*

The completion of the following plants:

The Ural Heavy Machinery Plant, capacity 100,000 tons;

The Kramatorsk Plant, output 150,000 tons;

The Chemical Apparatus Plant in the Urals;

The Orsk Steam Locomotive and Diesel Works, designed for 500 steam locomotives and 500 Diesels;

The Lugansk Locomotive Works, capacity 1,080 "FD" steam locomotives;

The Kashira Electric Locomotive Works designed for 300 trunk line engines;

The Kuznetsk and Irkutsk Railroad-Car Plants with a capacity of 10,000 four-axle cars each;

The Ural Railroad-Car Plant with a capacity of 54,000 four-axle cars;

The Gorky Automobile Plant designed for up to 300,000 four-axle cars;

The Stalin Automobile Plant in Moscow with a capacity of up to 80,000 cars;

The Yaroslavl Automobile Plant with a capacity of 25,000 five-ton trucks.

The construction of:

The West Siberian and Stalingrad Automobile Plants with a capacity of 100,000 three-ton trucks each;

The Samara Automobile Plant designed for 25,000 five-ton trucks.

The completion of:

The Ufa Motor Works designed for 50,000 motors;

The grinding, radial drilling, gear-cutting, automatic and heavy machine-tool plants in Kharkov, the Central Black Soil Region, the Saratov Territory, Kiev and Sverdlovsk;

The new ball-bearing plant designed for 24,000,000 bearings;

The Ural Electric Apparatus and Transformer Works;

The Kharkov Turbo-Generator Works, designed for 1,500,000 kw;

A number of tool and precision instruments works;

A number of textile machinery plants, plants manufacturing communal equipment and equipment for the food industry, the timber and paper industry, etc.

Regional electric stations:

The construction of 79 regional stations;

The completion of the construction of Svir No. 3, capacity 96,000 kw;

The construction of the following electric stations:

Svir No. 2	144,000 kw.
Dubrovka	100,000 "
Stalinogorsk	400,000 "
Shatura	180,000 "
Gorky	204,000 "
Kizel	100,000 "
Chelyabinsk No. 1	150,000 "
Chelyabinsk No. 2	100,000 "
Stalingrad (second section)	100,000 "
Nyesvyetai	100,000 "
Kemerovo Central Heat-and-Power Station	148,000 "
Zuyevka (second section)	250,000 "
West Donetz Basin stations	200,000 "
Dnieper Hydro-Electric Station	558,000 "
Chirchik	170,000 "
Kanakir	88,000 "
Khram River	60,000 "
Tuloma	48,000 "
Middle Volga-Perm	310,000 "
Yaroslavl	100,000 "
Gorky	200,000 "

The construction of the following plant stations of regional importance:

Magnitogorsk	198,000 kw.
Kuznetsk	108,000 "

The construction of the following huge central heat-and-power stations for urban heat-and-power development:

Stalin and Frunze Plants in Moscow, Moscow-Narva and Okhta Plants in Leningrad, the Sormovo-Kanavino Plant, the Krassnozavodsk Plant in Kharkov and others.

In the *coal* industry: the development of the construction of powerful pits with the opening for exploitation during the Second Five-Year Plan period of 178 pits having a capacity of 143,000,000 tons.

In the *oil* industry: the realization of a vast boring program, the construction of oil refineries, 46 stills for primary refining and 93 cracking plants; the construction of more than 4,000 km. of pipelines carrying oil and oil products.

Extensive construction in the *peat and oil shale* industry.

In the *iron and steel* industry: the putting into operation of 45 blast furnaces, 164 open-hearth furnaces and 107 rolling mills; the completion of the construction of the Magnitogorsk Plant designed for 2,700,000 tons of pig iron, of the Kuznetsk Works No. 1, the Tagil, Azov Steel, Tula, Lipetsk, Krivoy Rog and Zaporozhye Plants; the development of construction of the Kuznetsk Works No. 2, the Bakal, Khalilovo, Far Eastern and Nikopol pipe rolling mills and pipe foundries, and other plants.

In the *non-ferrous metals* industry: the construction of the Central Asia Copper Combination with a capacity of 50,000 tons and the Balkhash Combination designed for 100,000 tons, the completion of the construction of the Kazakstan Polymetal Works designed for 60,000 tons of lead and of the Chelyabinsk and the Orjonikidze Zinc Works, the completion of the first section of the powerful Altai Polymetal Combination, the construction of the Kemerovo Zinc Works, the completion of the construction of the Volkhov and the Dnieper Aluminium Combinations, the construction of the Ural Aluminium Combination designed for 25,000 tons, the Karelian Aluminium Plant designed for 8,000 tons and the construction of magnesium, nickel and other enterprises in the non-ferrous metals industry.

In the *chemical* industry: the completion and development of

construction of a number of sulphuric acid and soda works, fertilizer combinations, synthetic rubber works, aniline dyes and lacquer works, and factories manufacturing artificial fibre, rubber and asbestos, plastic materials, etc.

In the *cotton* industry: the construction of 15 big cotton enterprises, including the Tashkent combination (first and second section, capacity 100,000 spindles each); the Barnaul Plant (first and second section, capacity 100,000 spindles each); the Khojent and Charjui plants; also plants in Transcaucasia, the Ukraine and elsewhere.

In the *woollen* industry: the construction of 12 huge woollen mills with an output capacity of from 8,000,000 to 15,000,000 metres, including a worsted goods combination in the Ukraine and in the Azov-Black Sea Territory, cloth combinations in the Azov-Black Sea Territory, Lower Volga, Kazakstan, West Siberia, East Siberia and the Chelyabinsk Region.

In the *linen-goods* industry: the construction of 12 linen-goods combinations having a capacity of from 18,000 to 27,000 spindles, to be erected in the Ivanovo Region, in Orsh, Smolensk, the Gorky Territory, the Western, Moscow and Leningrad Regions and elsewhere.

In the *knit-goods* industry: the construction of 18 big mills, including those scheduled for West Siberia, the Middle Volga Territory, the Ukraine, Transcaucasia and the Central Black Soil Region.

In the *shoe and leather* industry: the construction of 21 shoe factories with a capacity of 100,000,000 pairs of shoes including those to be built in the Crimean Autonomous Socialist Soviet Republic, West Siberia, Tiflis, the Uzbek Socialist Soviet Republic, the Middle Volga Territory, the Sverdlovsk Region, the Kazak Autonomous Socialist Soviet Republic, the Gorky Territory, East Siberia, and so on.

The construction of a number of mills in the *needle-trades, silk, hemp* and other branches of light industry.

In the *food* industry: the construction of 40 huge meat-packing plants and the completion of the construction of 17 meat-packing plants started during the First Five-Year Plan period, including the plants in Moscow, Leningrad, Semipalatinsk, Baku, and Orsk, etc.; the construction of a number of sugar factories and the completion of the Ertilsk, Kamensk, Taldy-Kurgan and other factories; the construction of 6 soap factories at Irkutsk, Chita, Slavyansk

and elsewhere; the construction of fish products combinations, cold storage plants, vegetable oil factories, confectionery factories, starch and molasses factories and other enterprises of the food industry.

In the *timber* industry: the construction of lumber-sawing combinations and mills, of a great number of furniture factories, wood-chemical enterprises and plywood works.

In the *paper* industry: the completion of the construction of the Kondopoga and the Kama Cellulose and Paper Combinations and of the Syass Cellulose Combination; the construction of the Syegezha Cellulose and Paper Combination, the Krassnoyarsk, Bashkir, Ingur and Bzyb Paper Combinations and other plants.

6. To determine that during the Second Five-Year Plan period thousands of enterprises of *local* industry manufacturing articles for general consumption must be built or reconstructed which is to involve an investment of up to 2,000,000,000 rubles during these five years.

7. To fix the increase of labour productivity in construction during the Second Five-Year Plan period at 75 per cent, and the decrease in the cost of production during this period at 40 per cent of the actual level of 1932.

8. The Central Executive Committee and the Council of People's Commissars of the U.S.S.R. note that the Second Five-Year Plan ensures a more even *geographic distribution* of the country's forces of production, attended by the creation of new points of support for the industrialization of the Eastern Districts of the U.S.S.R. and the completion of the construction of the second coal and iron base of the Soviet Union, the bringing of industry into proximity with the sources of raw materials, the proper specialization in agricultural crops according to districts and a constant increase in the relative importance of the national republics and regions in the economic and cultural life of the country.

V. *Labour, Cadres and Culture*

1. To fix the increase in the number of workers and employees in the whole of national economy at from 22,900,000 persons in 1932 to 28,900,000 persons in 1937, or 26 per cent, inclusive of a rise in large-scale industry of from 6,300,000 persons in 1932 to 8,100,000 persons in 1937, or 29 per cent.

2. To specify a 2-fold increase in *real wages,* on the basis of a rise in the national income of from 45,500,000,000 rubles to

100,200,000,000 rubles (2.2-fold), a 2.5-fold increase in the rate of consumption of the most important food products and manufactured goods, a 35 per cent decrease in retail prices in State and co-operative trade, accompanied by greatly increased expenditures by the State for cultural and social purposes.

3. To set the increase in the wage fund of the workers and employees in the whole of national economy at from 32,700,000,000 rubles in 1932 to 50,700,000,000 rubles in 1937, *i.e.*, a 55 per cent rise, inclusive of an increase in large-scale industry of from 9,200,000,000 rubles in 1932 to 15,100,000,000 rubles in 1937, *i.e.*, by 64 per cent.

4. To increase appropriations for cultural and social services ministering to workers and employees (education, health protection and other purposes) from 4,300,000,000 rubles in 1932 to 9,300,000,000 rubles in 1937, *i.e.*, to 215.5 per cent of 1932.

5. For the purpose of successfully carrying out the technical reconstruction, the mastery of technique and the fulfilment of the qualitative indices, to solve, during the course of the Second Five-Year Plan period, the problem of creating a proletarian technical intelligentsia and of training the requisite number of specialists for national economy. To set the number of specialists to be graduated by colleges at 340,000 persons as against 170,700 persons during the First Five-Year Plan period—a 2-fold increase; and of specialists to be graduated by middle technical schools at 850,000 persons as against 308,000 persons during the First Five-Year Plan period —a 3-fold increase.

6. To give 5,000,000 workers a mass vocational training during the Second Five-Year Plan period by sending 2,500,000 persons through factory vocational schools, more than 1,500,000 persons through stationary agricultural schools and courses (for tractor drivers, brigade leaders, etc.), and 700,000 persons through chauffeurs' schools and courses.

7. To develop scientific research work on a vast scale, especially to improve the work of factory laboratories by enhancing their role in the mastery of the new technique and the scientific organization of the production process. To determine that during the Second Five-Year Plan period 15,100 trained science teachers be graduated.

8. To set the total number of skilled specialists in all branches of national economy by the end of 1937 at 4,010,000 persons as

against 2,737,000 persons by the end of 1932, *i.e.*, at 146.5 per cent of 1932, inclusive of the following increases:

In industry—520,000 persons as against 331,000 persons, *i.e.*, 157 per cent of the latter figure;

In transportation and communication—174,600 persons as against 107,000 persons, *i.e.*, 163.2 per cent of the latter figure;

In agriculture—425,000 persons as against 217,600 persons, *i.e.*, 195.3 per cent of the latter figure;

In health protection—400,000 persons as against 281,000 persons, *i.e.*, 142.3 per cent of the latter figure;

In education—1,535,000 persons as against 1,070,000 persons, *i.e.*, 143.5 per cent of the latter figure;

9. To designate as the principal task in the sphere of mass education under the Second Five-Year Plan not only the liquidation of illiteracy and semi-literacy among the adult population as well as the strict enforcement of universal elementary education, but also the carrying into effect of universal compulsory seven-year polytechnic education in town and country. Accordingly, to set the increase in the number of persons attending elementary and middle schools at from 21,700,000 in 1932 to 29,900,000 in 1937, *i.e.*, 137.8 per cent of 1932 (and from 24,200,000 persons in 1932 to 36,000,000 persons in 1937 if those attending factory vocational schools, workers' colleges, middle technical schools and colleges, including technical colleges, are added). In consequence the number of persons attending primary and secondary schools, factory vocational schools, workers' colleges, middle technical schools and colleges including technical colleges must rise from 147 to 197 per thousand of the population while simultaneously the number of pupils included in the system of pre-school education must increase from 5,200,000 to 16,000,000—*i.e.*, to 305.9 per cent of the former figure.

10. To increase the number of clubs (inclusive of reading rooms) from 49,300 in 1932 to 76,900 in 1937, inclusive of an increase in trade union clubs and clubs under the respective People's Commissariats of Education, from 6,800 in 1932 to 10,900 in 1937. The number of public libraries is to increase from 15,000 in 1932 to 25,000 in 1937, of Red Corners—from 99,000 in 1932 to 489,000 in 1937.

11. To set the following increases in printed matter: in aggregate newspaper circulation—from 35,500,000 per issue in 1932 to 56,000,000 per issue in 1937, and in the volume of books and

magazines—from 3,263,000,000 printed sheets in 1932 to 6,875,000,000 in 1937.

12. To increase the number of motion picture installations in the country (total for urban and rural districts) from 26,200 in 1932 to 70,000 in 1937, or a 2.7-fold increase.

13. In accordance with the tasks assigned, to set the amount of capital investments in education during the Second Five-Year Plan period at 4,000,000,000 rubles (including expenditures by economic bodies).

VI. *Housing, Communal Services and Health Protection*

1. Radically to improve housing conditions and communal services to meet requirements:

a) To set the increase in appropriations for housing construction at from 4,600,000,000 rubles under the First Five-Year Plan to 13,400,000,000 rubles under the Second Five-Year Plan, *i.e.*, a 2.9-fold increase; for municipal construction in cities—from 1,300,000,000 rubles to 6,200,000,000 rubles, *i.e.*, a 4.8-fold increase; for construction for purposes of education and health protection, appropriations must increase to 3,100,000,000 rubles and 2,900,000,000 respectively;

b) To develop new housing construction in the cities during the Five-Year Plan period, opening 64,000,000 sq. metres of housing space for occupancy;

c) To increase the number of cities supplied with water-works from 366 to 440, the number of cities supplied with sewers—from 55 to 125, the number of cities supplied with street cars—from 50 to 70; to develop the construction of the Moscow subway;

d) To engage in greenery planting, city planning, the building of Parks of Culture and Rest, stadiums, etc., on an extensive scale.

2. In public health:

a) To fix the amount of capital to be invested during the Second Five-Year Plan period at 3,500,000,000 rubles (including expenditures by economic bodies);

b) To increase the number of hospital beds in cities from 230,000 in 1932 to 331,000 in 1937—or 143.9 per cent of 1932; the number of hospital beds in villages—from 107,000 in 1932 to 212,000 in 1937, or a 98 per cent increase; to specify that the number of permanent crèche accommodations be increased from 624,000 in 1932 to 1,520,000 in 1937, or a 143.6 per cent increase.

VII. *Commodity Circulation*

1. To set the increase in retail commodity circulation throughout the country at from 31,900,000,000 rubles in 1932 to 80,000,000,000 rubles in 1937, or 250.7 per cent of 1932.

2. To reduce retail prices in State and co-operative trade to 35 per cent below the level of 1933, inclusive of a 34.5 per cent reduction in the prices of foodstuffs and a 35.3 per cent reduction in the prices of manufactured articles of general consumption.

3. By the end of the Second Five-Year Plan period, to increase the retail trade network (exclusive of the stationary collective farm trading points) from 295,600 units at the end of the First Five-Year Plan period to 405,000 units and to carry through the technical reconstruction of the retail trading network.

4. To set the number of workers and employées in town and country to be included in the system of public catering by the end of the Second Five-Year Plan period at 52,500,000 persons as against 21,000,000 persons at the end of the First Five-Year Plan period, *i.e.*, a 2.5-fold increase. To fix the number of dishes served annually by the public catering system in State and co-operative dining rooms at 25,100,000,000 as against 9,700,000,000 at the end of the First Five-Year Plan period, which constitutes a more than 2.5-fold increase.

To make it the duty of all public catering organizations to achieve a considerable improvement in the quality of food served.

M. KALININ
President of the Central Executive Committee of the Union of Soviet Socialist Republics

V. MOLOTOV
President of the Council of People's Commissars of the Union of Soviet Socialist Republics

A. YENUKIDZE
Secretary of the Central Executive Committee of the Union of Soviet Socialist Republics

Kremlin, Moscow,
November 17, 1934.

THE SECOND FIVE-YEAR PLAN FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R. (1933-37)

CHIEF TASKS OF THE SECOND FIVE-YEAR PLAN

I

THE Second Five-Year Plan for the Development of the National Economy of the U.S.S.R. is a plan which contemplates the final abolition of capitalist elements and of classes in general and provides for the transformation of the entire toiling population of the country into conscious and active builders of classless, socialist society. It is a plan for the completion of technical reconstruction in the whole of national economy and for the radical improvement of the standard of living of the masses of workers and peasants.

These tasks of general historic importance can only be accomplished by pursuing the path of further strengthening the dictatorship of the proletariat, of further industrializing the country and of fully completing the collectivization of agriculture.

The First Five-Year Plan was a plan of tremendous victories in the industrialization of the country. As a result of the First Five-Year Plan a modern, technically advanced, large-scale industry has been created in the U.S.S.R. Gigantic plants enjoying a world-wide reputation and in several instances far outstripping European technique were constructed in the machinery, metallurgical, electric power and chemical industries. In light industry and the food industry huge modern enterprises arose as the result of reconstructing old enterprises and of building new ones. The entire production apparatus of industry was radically reconstructed. Especially notable progress was achieved in the creation of a modern heavy industry—the material basis of socialism, the foundation for the reconstruction of the whole of national economy and the determining factor in the accelerated development of light industry and the food industry, of agriculture and transportation.

The U.S.S.R. was enabled to produce in its own enterprises the dominant portion of the equipment it needs.

The Second Five-Year Plan provides for a further tremendous growth of socialist industry. Under it the metallurgical industry of the South and the Ural-Kuznetsk Basin area is undergoing immense development. A new metallurgical base is being established in East Siberia and in the Far Eastern Territory. Machinery pro-

duction, especially the manufacture of machine-tools, is developing at a rapid rate. The manufacture of equipment for transportation, light industry and the food industry is making great strides, while the automobile industry is growing rapidly. Huge electric power stations and big mines are under construction, oil extraction is on the increase in the principal old districts, new oil districts are rapidly being developed and the construction of chemical combinations is proceeding on a vast scale. All this enlarges and strengthens the material basis of socialism and definitely ensures the technical and economic independence of the Soviet Union.

The victories scored in the sphere of the country's industrialization and the leading role of the working class in the socialist reconstruction of the countryside assured the absolute completion of collectivization in the principal grain districts as well as the rout of the kulaks even during the First Five-Year Plan period. The bulk of the peasantry—the collective farmers—has become the firm support of the Soviet Government in the countryside. During the Second Five-Year Plan period the collectivization of agriculture must be fully completed throughout the whole land. The increased technical equipment supplied to agriculture and the completion in the main of the mechanization of the latter, the organizational and economic consolidation of the collective and State farms, the transformation of the collective farms into truly Bolshevik farms, the strengthening of conscious labour discipline and the firmness with which the socialist attitude towards public property has established itself secure unprecedented prosperity for agriculture.

As a result of the historic victories of the First Five-Year Plan, "the socialist system now has unchallenged predominance and is the sole commanding force in the whole of national economy." (Stalin.)

The absolute completion of collectivization during the Second Five-Year Plan period and the final abolition of the kulaks as a class, concomitant with the inclusion of all handicraft production in the co-operative system, will signify that the private ownership of the means of production has been completely done away with. The privately owned sector, whose share in national economy was 56 per cent at the beginning of the First Five-Year Plan period, was only 7 per cent at the beginning, and will have completely vanished by the end, of the Second Five-Year Plan period. The mul-

tiplicity of systems in Soviet economy is being finally abolished and the socialist mode is becoming the sole mode of production throughout the whole land, whereby the causes which engender class distinctions and exploitation are being completely destroyed.[1]

The First Five-Year Plan, which gave rise to a great increase in the labour activity and heroism of the wide masses, developed new forms in which the socialist attitude toward labour finds expression—socialist competition and shock brigade work. The Second Five-Year Plan, which nurtures the socialist attitude toward work in the broad masses of workers and collective farmers, will still further strengthen socialist labour discipline.

But this socialist attitude toward public property, this increased, conscious labour discipline, this powerful development of the creative initiative of the millions upon millions of toilers who are mastering the modern high-capacity machine technique of large-scale socialist industry and agriculture, will be achieved only in the struggle against the bourgeois and petty-bourgeois survivals among the toilers. "We must overcome the resistance (frequently passive, which is particularly stubborn and particularly difficult to overcome) of the numerous remnants of small-scale production, we must overcome the tremendous force of habit and inertia which attaches to these remnants." (Lenin.)

The rising cultural level of the toilers is a very important factor in strengthening socialist labour discipline in town and country and in overcoming the remnants of capitalism in the minds of the people. Having achieved universal literacy during the First Five-Year Plan period, the U.S.S.R. during the second quinquennial period is abolishing the semi-literacy of the able-bodied adult population, is making universal seven-year compulsory polytechnic training a reality in town and country and will fully solve the problem of creating proletarian cadres of skilled technical and scientific workers throughout the land.

The final abolition of the parasitic classes, the vast increase in productive forces and the more than 2-fold increase in the national income ensure during this period a radical improvement in the standard of living of the workers and peasants. The national income of the U.S.S.R. is rising from 45,500,000,000 to 100,200,000,-

[1] At the time the New Economic Policy was inaugurated (1921) the Soviet Union contained the elements of five socio-economic systems: 1) patriarchal economy (which to a considerable degree is natural, self-sufficing economy); 2) small commodity production (the majority of the peasants who sell grain); 3) private capitalism; 4) state capitalism; 5) socialism.

000 rubles. The sum total of articles of consumption provided for out of the national income is increasing 2.4-fold and will comprise 78.7 per cent of the national income in 1937 instead of the 73.1 per cent in 1932. On the basis of the 2.5-fold increase in the output of manufactured goods of general consumption and the doubling of the output of agriculture, the supply of primary articles of consumption to the population is rising 2 to 3-fold in comparison with the last year of the First Five-Year Plan period. The development of Soviet trade is paving the way for the abolition of the rationing of products, while the fulfilment of the tasks relating to lower production costs, expenses of distribution and increased labour productivity secure a decrease in retail prices amounting to 35 per cent. The construction of dwellings and municipal service facilities is developing at a rapid pace. The real wages of the workers and employees are doubling. The problem of making all collective farmers well-to-do is being solved.

The absolute completion of collectivization in the countryside and the transformation of the whole of agriculture, viewed in its social aspect, into a type identical with industry, the transformation of agricultural labour into a variety of industrial labour, the increase in transportation facilities and the considerable development of commodity circulation between town and country, the decided rise in the cultural level of the countryside and the approximation of the level of material welfare and culture of the rural to that of the urban toilers assure great progress during the Second Five-Year plan period in overcoming the contrast between town and country and creating all the conditions necessary for the complete elimination of this contrast.

The more rapid development of the national economy in the national districts, the industrial exploitation of their inexhaustible natural wealth, the development of transportation and the more rapid rise in their cultural level ensure the elimination of the economic and cultural backwardness of the national republics and regions during the Second Five-Year Plan period.

The final abolition of classes during the Second Five-Year Plan period can only be achieved in a struggle against the remnants of capitalism. This signifies that on individual sectors and during certain periods of socialist construction an accentuation of the class struggle and new attempts on the part of the remnants of the rich peasantry to subvert the collective farms, attempts on the part of anti-Soviet forces to engage in wrecking activities in Soviet

industrial enterprises, are inevitable. Only by mercilessly crushing the resistance of the routed but not yet finally defeated capitalist elements, only by unswervingly combating all opportunism, by increasing the vigilance and reinforcing the might of the proletarian State will the proletariat of the Soviet Union be able to solve, jointly with the collective farm masses and under the leadership of the Communist Party, the towering problems of the Second Five-Year Plan and overcome all and sundry difficulties on the road to socialist construction.

Improving the quality of organizational and practical leadership is of exceptional importance for the further success of socialist construction. "Organizational and practical work nevertheless lags behind the demands of the political directives and does not satisfy the requirements of the present period, the period of the Second Five-Year Plan." *(Resolution of the Seventeenth Congress of the C.P.S.U.)*

Therefore the carrying into execution of the following directions given by J. Stalin at the Seventeenth Party Congress is an absolutely essential pre-condition of success in the realization of the Second Five-Year Plan:

> "1) To continue to make our organizational work commensurate with the requirements of the political line of the Party;
>
> "2) To raise organizational leadership to the level of political leadership;
>
> "3) To secure such organizational leadership as will fully guarantee the application of the political slogans and decisions of the Party."

II

In accordance with the tasks set by the Second Five-Year Plan, the total volume of industrial output (in 1926-27 prices) is fixed at 92,700,000,000 rubles for 1937 as against 43,300,000,000 rubles in 1932. The scale of growth of industrial output is so stupendous that the increase alone in the output of industry for the last year of the Second Five-Year Plan period will exceed the entire industrial output of pre-war Russia, and the entire output of industry in 1937 will be approximately eight times the pre-war industrial output.

The average annual rate of increase of output for all industry will be 16.5 per cent. The projected rates of increase of output far surpass the records made by the U.S.A., the foremost capitalist country.

Whereas during the Second Five-Year Plan period the output of the whole of Soviet industry is increasing by 114.1 per cent, the increase in the industrial output of the U.S.A. during the years of "prosperity" (1924-29) was 26.6 per cent, or less than one-fourth the said rate of growth of industrial output of the U.S.S.R.

While steadfastly maintaining the course of industrializing the country and increasing the production of the means of production almost 2-fold (197.2 per cent), the Second Five-Year Plan con templates a more rapid growth in the production of articles of consumption (233.6 per cent). While the average annual rate of increase in the production of means of production is equal to 14.5 per cent, the average annual increase in the production of articles of consumption is 18.5 per cent. Of the total increase in industrial output amounting to 49,400,000,000 rubles in 1937 in comparison with 1932, 27,000,000,000 rubles or 54.6 per cent will go to augment the output of the branches of industry manufacturing articles of consumption.

The production of iron and steel and of non-ferrous metals, the generation of electric power, the manufacture of chemicals, coal mining and machinery production show the most rapid rates of growth in heavy industry.

In the machinery and metal-working industries the volume of output is growing from 9,400,000,000 rubles in 1932 to 19,500,000,-000 rubles in 1937, *i.e.*, a more than 2-fold increase (207 per cent). The manufacture of transportation equipment (railroad, automotive and ship-building) and of tractors, machine-tools, equipment for light industry and the food industry are developing at rates above the average for machinery production as a whole. The growth of machinery production at the projected rates guarantees that by the end of the Second Five-Year Plan period all branches of national economy will be provided with a comprehensive supply of technically advanced equipment and machinery, and that all the machinery requirements of national economy will be met by domestic manufacturing. The machines and equipment supplied to national economy during the Second Five-Year Plan period will at the end of that period constitute from 50-60 per cent of the total quantity of means of production in all branches of national economy.

The manufacture of machine-tools, a most important branch of machinery production, is growing apace. The mastery of the technique of the various plants built during the First Five-Year

Plan period—the turret lathe plant in Moscow, the drilling and grinding machine plant in Kharkov, the milling machine plant in Gorky, the reconstructed Red Proletarian Plant, and the construction of a new group of machine-tool plants, of a heavy machine-tool plant, of a grinding machine plant, etc., will raise the output of modern machine-tools 2.7-fold in comparison with the last year of the First Five-Year Plan period.

The development of the manufacture of power plant equipment and of the electrical machinery industry will completely meet the requirements of the rapidly progressing electrification of the country.

The immense growth of the metallurgical industry during the Second Five-Year Plan period is being secured preponderantly by supplying domestic equipment to the Soviet manufacturing plants, equipment manufactured primarily at the Ural Machinery Plant and the Kramatorsk Plant, each of which is a model in size and technical superiority.

The Second Five-Year Plan maps out extensive development in the manufacture of transportation equipment. Besides completing the construction of the Lugansk and Novo-Cherkassk Locomotive Works, the Nizhni-Tagil Car Plant and the Amur Shipyard, all of which were commenced during the First Five-Year Plan period, the second quinquennial period is witnessing the erection of the Orsk Diesel and Steam Locomotive Works, the Kuznetsk Steam Locomotive Works, the Kashira Electric Locomotive Works, the Kuznetsk and Irkutsk Freight Car Plants, the Kazan Passenger Car Plant and others. To characterize the technical level and capacity of these enterprises it is sufficient to point out that for instance the capacity of the Lugansk Steam Locomotive Works will exceed that of the Henschel Locomotive Works in Germany, the biggest in Europe, and will be about on a par with the Baldwin Locomotive Works in the U.S.A., the largest in the world.

The construction of automobile plants during the Second Five-Year Plan period is greatly augmenting the capacity of the automobile industry. The Gorky Automobile Plant is being considerably enlarged, its output being brought up to 300,000 motor vehicles; that of the Stalin Plant in Moscow is being raised to 80,000 motor vehicles, inclusive of 10,000 passenger cars; the Yaroslavl Plant is having its capacity raised to 25,000 5-ton trucks, etc. Two new plants—the West Siberian and the Stalingrad Plants—for the manufacture of 3-ton trucks with a capacity of 100,000 trucks a

year each, and the Samara 5-ton truck plant with a capacity of 25,000 trucks a year are under construction.

The manufacture of equipment for light industry and the food industry is developing: the output of the specialized textile machinery factories will multiply 5.8 times by 1937, while the specialized manufacture of equipment for the food industry will multiply 2.7 times in comparison with 1932. This output together with the manufacture of such equipment at other plants ensures the technical re-equipment of light industry and the food industry.

During the Second Five-Year Plan period agriculture obtains its supply of machinery from the developed domestic manufacture of tractors and agricultural machinery. The Chelyabinsk Heavy Tractor Plant which started operations during the first year of the Second Five-Year Plan period and the Stalingrad Plant which is being re-equipped to produce caterpillar tractors, taken in conjunction with the complete mastery of production at the Kharkov Factory and the organization of the production of row crop tractors at the Red Putilov Plant ensure a more than 3-fold increase in the capacity of the tractor fleet. The further development of agricultural machinery production makes it possible during the Second Five-Year Plan period to equip agriculture with a comprehensive stock of machinery and implements for grain farming and industrial crop raising adequate in the main to complete the mechanization of agriculture.

The high technical level of Soviet machinery production creates the conditions necessary for the development of the mass production of high-grade metal manufactures of general consumption. The manufacture of bicycles is increasing 4.5-fold, of watches 4.8-fold. The output of radio receiving sets is growing from 29,300 to 500,000. The production of electrical household articles is rising sharply, etc.

The whirlwind growth of the domestic manufacture of modern, perfected machinery ensures an intensive process of mechanization and the development of machine technique in all branches of national economy, the displacement of hand labour by machine labour. This finds its expression in the constantly increasing mechanization of laborious processes in all branches of national economy. The mechanization of the coal industry is being completed, the proportion of peat extracted by mechanized methods is rising considerably, the mechanization of the timber industry is undergoing a tremendous development, the mechanizatioin of metal

production, building, loading and unloading operations in transportation, etc., is being realized on an increasingly large scale. The mechanization of agriculture is in the main being completed. The displacement of heavy physical labour by machines in all branches of national economy on so wide a scale expresses the universality and profundity of socialist industrialization during the Second Five-Year Plan period, and concomitantly reflects one of the main differences between socialist industrialization aand capitalist industrialization.

Electrification is a most important link in completing the chain of technical reconstruction in national economy.

During the Second Five-Year Plan period, the completion in the main of the electrification of industry transforms the latter into the most advanced industry in the world with respect to electric power supply. The replacement of mechanical drives by new, electric drives and the quite considerable development of types of manufacturing that consume great quantities of electric current based on the use of electric power in chemical and heating processes (especially in the metallurgical and chemical industries) are highly important factors in the program of industry's technical reconstruction.

The electrification of transportation is being developed on a vast scale. By the end of the Second Five-Year Plan period the length of electrified railways in the U.S.S.R. must be brought up to 5,050 km. as against 3,600 km. in the U.S.A. in 1929. Electricity will be applied on a larger scale in the various production processes of agriculture. Finally, the consumption of electricity for urban transportation and for other cultural and social needs will increase considerably.

In 1937, 38,000,000,000 kwh. of electricity will be generated as against 13,400,000,000 kwh. in 1932. The capacity of electric power stations is being increased from 4,690,000 kw. in 1932 to 10,900,000 kw. in 1937. Most of the electric current will be generated at regional power stations. In fact the larger regional power stations having a capacity of over 100,000 kw. each will supply almost half of all the electricity generated in the country. The great power stations built during the First Five-Year Plan period (the Kashira Station, the Shatura Station, the Dnieper State Regional Electric Power Station, the Zuyevka, the Shterovka, Baku, Chelyabinsk and other power stations) are being supplemented by new huge power stations of the greatest importance in the power sup-

ply of the country—the Stalinogorsk Station (400,000 kw.), the Kemerovo Station (148,000 kw.), the new central heat-and-power plant at the Donbas (200,000 kw.), the considerably enlarged Kizel, Magnitogorsk and Stalinsk Power Stations, the urban heat-and-power central stations of the Moscow-Narva and the Okhta Plants in Leningrad, the Frunze Plant in Moscow, the Sormovo-Kanavino Plant, the Second Chelyabinsk Plant, and so forth. To these must be added the following big hydro-electric stations—the Svir Stations Nos. 2 and 3, the Chirchik Station (170,000 kw.), the Kanakirsk (88,000 kw.) and one on the Khram River (60,000 kw.). All these stations will be of great importance in the country's supply of electricity. The Yaroslavl Hydro-Electric Power Station (100,000 kw.), the Balakhna Hydro-Electric Power Station (200,000 kw.) and the Perm Hydro-Electric Power Station (310,000 kw.) which have been begun during the Second Five-Year Plan period and will be completed during the Third Five-Year Plan period deserve special mention because of their magnitude and importance.

The interconnection of regions is a most important factor in electrical construction. During the Second Five-Year Plan period the interconnection of the regional stations within the individual regions is being completed in the main and the creation of inter-regional super-power systems has been begun. The major portion of electricity generated will be fed into eight gigantic electric power junction points which will supply two-thirds of the total electric power generated in the country. The interconnection of the Dnieper and Donetz Basin power systems is setting up the biggest super-power system in the world with a potential generating capacity of 9,000,000,000 kwh., thus exceeding the Niagara system, the largest in the U.S.A.

The successes achieved under the First Five-Year Plan in the utilization of local power resources make it possible during the Second Five-Year Plan period to base the generation of electric power in the main on local fuel, on waste products of coal mining, and especially on water power. The proportion of oil and of Donetz coal in the fuel supplied to regional power stations is falling from 33.8 per cent in 1932 to 21 per cent in 1937, while the burning of oil as a fuel at electric power stations is being reduced to a minimum (4.1 per cent in 1937 as against 19.6 per cent in 1932). The proportion of power generated by hydro-electric power stations is rising sharply (from 7.3 per cent to 19.5 per cent). The new hydro-electric power stations as a rule solve problems of transportation

and irrigation alongside of problems of electric power supply.

Heat-and-power development is showing especially great progress during the Second Five-Year Plan period.

New central heat-and-power stations erected during the Second Five-Year Plan period are to be used to supply heat to cities and industries; under the Second Five-Year Plan the heating capacity of the heat-and-power plants constitutes 43.3 per cent of the total increase in heating capacity.

In absolute level of heat-and-power development, the U.S.S.R. will far outstrip the most advanced countries of the capitalist world.

The strengthening of the modern power base of the Soviet Union demands the further development of the fuel industry. Coal mining will grow to 152,500,000 tons by the end of the Second Five-Year Plan period and the capacity of the mines will be increased to 238,800,000 tons by the end of 1937.

The Donetz Basin, which remains the principal coal basin of the country, will increase its output in 1937 to 80,000,000 tons as against 43,800,000 tons in 1932. New coal regions which will play a great part in the mineral fuel supply of quite a number of districts are developing at an especially rapid rate. The Kuznetsk Basin which is to become a second Donetz Basin will be the principal source of coal supply for the widely developing metallurgical industry of the Urals and West Siberia.

The Karaganda Basin—the third coal region of the Union—is acquiring great importance.

In the Far North the Pechora coal deposits which will form the coal base of the Northern districts and of the Great Northern Sea Route, are beginning to be exploited. Coal mining is also developing in the Moscow Basin, East Siberia, the Far Eastern Territory (Bureya) and Central Asia.

The great increase in the number of automobiles and tractors requires a considerable expansion of oil production and the refining of light oil products. In 1937 oil extraction must rise to 46,800,000 tons or more than 2-fold. Further mastering of exploitation in the old districts and increased production and refining of oil in these districts, the creation of a new base for the oil industry in the East (Bashkiria, the Urals, Central Asia), accompanied by the wide development of prospecting and boring will ensure the successful fulfilment of the tasks assigned by the Second Five-Year Plan with regard to oil.

During the Second Five-Year Plan period special attention must be paid to the further carrying out of the technical reconstruction of the oil industry, mastering deep boring, the new, perfected modern methods of oil extraction and the new methods of refining now applied in the progressive plants of the U.S.A.

The Second Five-Year Plan confronts the iron and steel industry with the task of increasing the smelting of pig iron to 16,000,000 tons in 1937, or a 2.6-fold increase; of increasing the production of steel to 17,000,000 tons, or a 2.9-fold increase; of rolled metal to 13,000,000 tons, or a 3-fold increase; also a 3.6-fold increase in the manufacture of special steels. The growth of the output of the iron and steel industry at the rates projected will eliminate the disparity between pig iron and steel production, will make certain that the metal demands of national economy are satisfied and will liquidate the lag of the metallurgical industry behind the general rates of development of national economy.

By the end of the Second Five-Year Plan period the iron and steel industry will raise the output of metal required for the machinery industry and for construction 2.3-fold, of rails for railroad transportation—4.2-fold and of metal for agriculture—5-fold.

The rapid growth of automobile manufacturing, aircraft construction and the manufacture of tools demands a particularly rapid development in the output of special rolled steel. The manufacture of such steel is growing from 555,000 tons in 1932 to 2,000,000 tons in 1937. The manufacture of electric steel is growing at a still more rapid rate: from 101,000 tons during the last year of the First Five-Year Plan period to 600,000 tons during the last year of the Second Five-Year Plan period, or a 6-fold increase.

During the Second Five-Year Plan period, 45 new blast furnaces, 164 open-hearth furnaces, 107 rolling mills (13 of which will be blooming mills and one a slabbing mill) are being built and put into operation.

During the Second Five-Year Plan period the construction of a number of gigantic iron and steel combinations each representing a complete metallurgical cycle, and a number of huge specialized works (tube-rolling mills, tin plate mills, pipe foundries, ferro-alloys plants and so forth) are to be completed.

Likewise the construction of 4 large-sized combinations (the second Kuznetsk, the Bakal, the Khalilovo, the Far Eastern) is to be expedited. As a result the capacity of the iron and steel industry will be enlarged to approximately 21,800,000 tons of pig

iron, 22,500,000 tons of steel and 19,000,000 tons of rolled metal. The most advanced equipment in point of capacity and mechanization is being installed in the factories of the U.S.S.R.: blast furnaces having a volume exceeding 1,000 cubic metres, 150 to 250-ton open-hearth furnaces, continuous rolling mills, etc.

At the end of the Second Five-Year Plan period 80 per cent of all pig iron instead of the 25 per cent during the First Five-Year Plan period will be smelted in completely mechanized blast furnaces.

During the Second Five-Year Plan period one of the most important tasks of the iron and steel industry consists in eliminating the lag of rolled metal output behind that of pig iron and steel. This is to be accomplished by accelerating the construction and expansion of metal-rolling and pipe-rolling mills, and by establishing such proportions of the individual types of rolled metal as will completely satisfy the multifarious requirements of national economy (sheet metal, tubing, rails, wire, tin plate, etc.).

The production of non-ferrous metals, which must attain such proportions as will in the main satisfy the considerably rising demands of national economy, is growing at a faster tempo than the production of iron and steel.

Copper manufacturing must be brought up to 135,000 tons, the lead output must be increased 6.1-fold; the manufacture of aluminium must be greatly developed and the manufacture of tin, nickel and magnesium must be newly introduced. The manufacture of rare metals (vanadium, molybdenum, etc.,) must likewise be developed. The fulfilment of this program requires that considerably more attention be paid to systematizing the manufacture of non-ferrous metals and that considerably bigger funds be applied to this end.

The introduction of chemical processes in national economy—this powerful factor in the development of the country's forces of production and in the consolidation of its defence capacity—must be raised to a new high plane.

The manufacture of mineral fertilizers for agriculture is making rapid progress. Fuel chemistry is being extensively applied for the first time to oil, coal, peat and oil shale. The complete utilization of raw material, and the combination of the production of iron, steel and non-ferrous metals with that of chemicals is being intensified. New kinds of raw material—apatite, nepheline, Solikamsk potassium salts, etc., the extraction of which was mastered

during the First Five-Year Plan period—are being introduced on a larger scale in the chemical industry.

New branches of the chemical industry (the manufacture of synthetic rubber, plastic materials, etc.) are developing to a considerable extent.

The output of the entire chemical industry is increasing 2.8-fold, with the output of the basic branches of the heavy chemical industry increasing 4.9-fold. The volume of output projected during the Second Five-Year Plan period for the chemical industry ensures the liquidation of its lag behind the general rates of development of national economy and transforms the chemical industry into a foremost branch of national economy.

The manufacture of building materials is increasing in volume to meet the demands of construction mapped out for the Second Five-Year Plan period.

The manufacture of cement is more than doubling while that of saw-mill products is increasing by 76 per cent.

The cutting and hauling of merchant timber is increasing by 71 per cent.

The powerful development of heavy industry during the Second Five-Year Plan period alongside of the tremendous expansion of the raw material base of light industry and the food industry makes it possible to project a 2.5-fold increase in the output of these branches for the Second Five-Year Plan period.

The Plan maps out a 2.1-fold increase in the output of the cotton industry, a 2.5-fold increase in the woollen industry, a 4.6-fold increase in the knit-goods industry. The manufacture of leather footwear is multiplying 2.2 times, that of soap—2.8 times.

In the food industry the output of sugar is showing the fastest rate of increase, *viz.*, 3.0-fold. In the case of canned goods the increase is 2.8-fold; in the case of meat packing—also 2.8-fold.

During the Second Five-Year Plan period the technical reconstruction of light industry and the food industry is being widely developed. The construction of 15 big cotton mills, 12 big woollen mills, 12 linen factories, 18 huge enterprises for the knit-goods industry, 11 silk mills, 21 shoe factories, a great number of factories and mills in other branches of industry and the reconstruction of the existing enterprises in all branches of light industry will enlarge the production capacity of light industry approximately 2-fold.

In consequence the light industry of the U.S.S.R. will occupy first place in Europe in point of technical level.

The construction of meat-packing plants, most of which are of the American type, the construction of new sugar refineries, the considerable enlargement of the capacity of the sugar industry and the rise in its technical level, the technical re-equipment of the fisheries and the tremendous increase in their fleet, the increased volume of high-quality products and the 2.2-fold increase in cold storage facilities all characterize the completion of the creation of a technically advanced food industry in the U.S.S.R.

The mobilization of local raw material for the purpose of increasing the output of articles of general consumption, and the 2.5-fold augmentation of the volume of articles of general consumption manufactured by handicraft co-operative organizations will serve as a supplementary source for satisfying the rapidly growing demands of the workers and collective farmers in every respect.

The output of commodities in general use manufactured by local industry is growing at a more rapid rate (3-fold) than the output of these commodities manufactured by the enterprises under the People's Commissariat of Supply, the People's Commissariat of Light Industry and the handicraft co-operative organizations. The output of articles of general consumption manufactured under the People's Commissariats of Heavy Industry (the People's Commissariat of Heavy Industry and the Peoples's Commissariat of Timber) is also developing more rapidly, as a result of which the output of all enterprises of the Union manufacturing articles of general consumption is rising 2.5-fold.

It is necessary to combat determinedly any tendency to underestimate the need to develop local industry. The initiative of the local bodies must be developed on a vaster scale, and their material interest must be secured by permitting them to retain a considerable portion of the profits made in local industry; also by consolidating the base of local industry by transferring a number of enterprises of Union or Republic importance to the jurisdiction of the local bodies.

Consequent upon this considerable increase in the output of heavy, of light and the food industry, upon the completion of the technical reconstruction of national economy and the mastering of the new technique and of production in the new enterprises, the U.S.S.R. will capture first place in Europe by the end of the

Second Five-Year Plan period not only in respect to the level of the technical base of its national economy but also in respect to the absolute volume of industrial output, even when compared with the pre-crisis year of 1929, not to mention the years of the crisis itself. This appears from the following figures:

Rank of the U.S.S.R. in World Industrial Output[1]

Classification of Products	1913	1928	1932 [2]		1937 [2]	
	In whole world	In whole world	In whole world	In Europe	In whole world	In Europe
Total output	—	5	3	2	2	1
Electricity	15	10	7	4	2	1
Coal	6	6	4	3	4	3
Peat	—	—	1	1	1	1
Oil	2	3	2	1	2	1
Pig iron	5	6	5	4	2	1
Steel	5	5	5	4	2	1
General machinery production	4	4	2	1	2	1
Agricultural machinery production	—	4	2	1	2	1
Tractors	—	4	2	1	2	1
Harvester-combines	—	—	2	1	2	1
Motor vehicles	—	12	7	5	3	3
of which: Trucks	—	11	6	4	2	1
Copper	7	9	9	2	3	1
Aluminium	—	—	11	9	2	1
Cement	—	8	7	5	2	1
Phosphate fertilizers (superphosphate)	—	18	9	6	2	1
Footwear	—	5	3	2	2	1
Soap	6	5	5	4	2	1

[1] Figures for the capitalist world are taken from *Statistical Year Book of the League of Nations*, 1932.

[2] 1932 and 1937—in comparison with the output of the capitalist countries in 1929.

Thus in contradistinction to the capitalist world which is experiencing a most profound general crisis of its system, the proletariat of the Soviet Union during the Second Five-Year Plan period is achieving victories of the greatest historical importance in the development of the forces of production, in the realization of the slogan "to overtake and surpass the capitalist countries technically and economically." While the crisis has hurled the capitalist world far below the 1929 level of production, the U.S.S.R. is overtaking all the capitalist countries of Europe in respect to their absolute

volume of output in 1929, the year when industrial development in the capitalist countries was at peak and when their production apparatus was utilized to a maximum.

III

For agriculture, the First Five-Year Plan period was "not so much a period of rapid rise and powerful upswing as a period of creating the prerequisites for this rise and upswing in the near future." (Stalin.) The First Five-Year Plan period was a period of collectivization and of the creation of a powerful network of State farms.

The absolute completion of the collectivization of agriculture and the transformation of the collective farms into Bolshevik collective farms, the consolidation of the State farms and the inclusion of all collective farms in the service supplied by the machine and tractor stations, on which basis these farms are being equipped with advanced machine technique, ensure an unprecedented development of the forces of production during the Second Five-Year Plan period.

Socialist industry will deliver to agriculture by the end of the Second Five-Year Plan period a considerable number of tractors representing a total capacity of 8,680,000 h.p., 170,000 motor vehicles, agricultural machinery and implements valued at 2,610,000,000 rubles with an increase in the total number of harvester-combines to 100,000 and of chemical fertilizers to millions of tons. During this period agriculture passes on from the mechanization of individual processes to the mechanization of all the principal branches of production. The mechanization of ploughing to the extent of 80 per cent, the cultivation of fallow land and of row crops to the extent of 70 per cent by the use of tractor-drawn cultivators, the harvesting of grain crops by means of tractor-drawn implements to the extent of 60 per cent, the mechanization of the harvesting of a considerable portion of the industrial crops and the threshing of the grain crops by mechanically-driven appliances to the extent of 85 per cent indicate the scale on which the new technique is being introduced in agriculture.

The mechanization of agriculture will in the main be completed during the Second Five-Year Plan period. The solution of the problem of mechanizing the harvesting of the cotton, sugar-beet and flax crops will be a particularly important link in the technical revolution in agriculture. In farming, where hand labour greatly

predominated in the recent past, a powerful system of machinery is being installed during the Second Five-Year Plan period which is transforming agricultural labour into a variety of industrial labour.

Electricity is gradually penetrating agriculture. Electric threshing is being extensively applied, a number of production processes are being electrified on the stock-raising State farms, experimental districts of electrified agriculture will be established and electric lighting of rural districts will be introduced on a mass scale.

As a result of the Second Five-Year Plan the U.S.S.R. is outstripping the most advanced country—the U.S.A.—in degree and level of mechanization of agriculture, thus moving the U.S.S.R. to first place in the world.

During the Second Five-Year Plan period the tempo of development of agriculture, reconstructed along socialist lines, will approximate the tempo of growth of socialist industry. The extensive application of scientific farming, the sharp increase in the areas sown with assorted seed, while systematizing all sowing and extending the sowing areas only slightly, will create the basis for a considerable rise in yield which will ensure a doubling of the gross output of agriculture. The gross output of grain crops must total 1,048,000,000 centners in 1937, as a result of which the U.S.S.R. will, by the end of the Second Five-Year Plan period, surpass the U.S.A. in the quantity of grain produced.

The First Five-Year Plan solved the grain problem in the main. The Second Five-Year Plan is solving it finally and is thereby ensuring the immense development of all the remaining branches of agricultural production. The final solution of the grain problem makes it possible fully to guarantee the food supply of the country, to more than treble the grain fed to cattle and to create considerable State and collective farm grain reserves.

The production of industrial crops is growing at a more pronounced rate than the production of the grain crops, their value reaching 2,400,000,000 rubles in 1937 as against 1,100,000,000 rubles in 1932.

During the Second Five-Year Plan period the group of textile industrial crops is making rapid progress (cotton, flax, hemp and new fibre crops). The gross volume of unginned cotton picked is increasing by 67.1 per cent. The new fibre crops which replace industrial crops formerly imported (jute, etc.), begin to play an

essential part in textile manufacturing during the Second Five-Year Plan period. The output of raw material for the food industry is sharply increasing—of sugar beet—4.2-fold, of vegetable oil seed —almost 2-fold, of tobacco—2.3-fold.

The output of the new industrial crops is growing considerably during the Second Five-Year Plan period. Here particularly high rates of expansion have been mapped out for the rubber-bearing plants.

The highly valuable crops of the sub-tropical districts are developing at an especially high rate. The rapid rise in tangerine, lemon and other citrus plantations, the wide distribution of volatile oil plants, tung trees, cork oaks and other sub-tropical plants must emancipate the Soviet Union from the importation of their exceedingly valuable crops.

The doubling of the gross output of agriculture on the basis of completing collectivization and transforming the State farms into model agricultural enterprises will considerably augment the commodity production of agriculture. The centralized State grain collections and the payments in kind made to the machine and tractor stations are rising to an aggregate of 30,000,000 tons (an increase of 58.4 per cent). Meat collections are increasing to 1,334,000 tons (96 per cent), collections of milk and dairy products—to 5,800,000 tons (178.1 per cent). The inclusion of all collective farms in the service supplied by the machine and tractor stations at the same time increases the total amount paid in kind by the collective farms for the work performed by these stations. By the end of the Second Five-Year Plan period this will increase the percentage which the payments in kind made to the machine and tractor stations form of the grain resources of the State.

The considerable increase in the gross amount of grain and other crops harvested is trebling the resources available for collective farm trade. The collective farm trade in grain is rising from 900,000 tons to 4,500,000 tons; the share of collective farm trade in the total commodity grain production is rising from 4.6 per cent to 13 per cent. The meat resources for collective farm trade are multiplying 4 times and their proportion in the total commodity meat output is rising from 23.9 per cent to 36.3 per cent. Collective farm trade in milk and dairy products, potatoes and other vegetables is growing considerably.

During the First Five-Year Plan period there was a decline in

stock-raising, the branch which suffered most during the reorganization period. During the Second Five-Year Plan period the problem of stock-raising must be solved in the main and "the whole Party, all our workers, Party and non-Party, must take the problem of stock-raising in hand, bearing in mind that today the problem of stock-raising is as urgent as the grain problem—now successfully solved—was yesterday." (Stalin.)

Maximum consolidation of the collective stock farms, which play a decisive part in the development of stock-raising, transformation of the State stock farms into model enterprises, introduction of stock-raising on State farms of other classifications, securing cows and small stock to all collective farmers parallel with a notable development of the forage supply base represent the main paths along which stock-raising is rapidly developing.

The output of livestock products during the Second Five-Year Plan period must rise from 3,200,000,000 rubles to 7,100,000,000[1] rubles in 1937. At the same time the number of cattle must increase by more than 60 per cent, the number of pigs must multiply more than 3.7 times, the number of sheep and goats must grow 84.3 per cent. In the struggle to improve cattle-raising the questions of enhancing the breed and productivity of the animals, of the vast development of pure-breed stock-raising, the extensive practice of cross-breeding and of improving the scientific stock-breeding service must receive much more attention on the part of the Communist Party and Soviet public as a whole than was the case hitherto.

To raise all agriculture to a level at which it will satisfy the agricultural raw material and foodstuff requirements of national economy is possible only if the State and collective farms will be further consolidated organizationally and economically. The splitting up of the State farms, the discontinuance of their excessive specialization, the struggle to transform all State farms into highly profitable enterprises must enhance their role of model grain and meat producing plants.

The task of achieving a higher rate of return also confronts the collective farms. The road leading to this goal lies in the direction of strengthening labour discipline, consolidating the artels and increasing the material interest of each collective farmer in

[1] Exclusive of the value of the natural increase of the herds.

the development of the socialized economy of the collective farms as a whole. These are the main prerequisite conditions for making all collective farmers well-to-do.

IV

The 2.1-fold increase in the output of industry, the doubling of the output of agriculture, the strengthening of the economic ties between town and country and the radical improvement in the material and cultural condition of the toiling masses demand that the lag of transportation behind the needs of national economy be overcome as rapidly as possible. Transportation must become a foremost branch of national economy. This can be accomplished by the radical reorganization of its work and the thorough technical reconstruction of all its departments.

The Second Five-Year Plan projects an increase in the freight turnover of the railroads of from 169,300,000,000 ton-km. in 1932 to 300,000,000,000 ton-km. in 1937, or an increase of 77.2 per cent; in river transportation—from 26,100,000,000 ton-km. in 1932 to 63,000,000,000 ton-km., or an increase of 141.4 per cent; and of motor haulage—from 1,070,000,000 ton-km. in 1932 to 16,000,000,000 ton-km. in 1937, or a fifteen-fold increase. The development of motor haulage and waterway transportation was mapped out to attain a relatively higher tempo by reason of the necessity of distributing freight traffic more rationally over the various modes of transportation.

Passenger transportation by rail is projected to increase from 966,600,000 passengers in 1932 to 1,309,500,000 passengers in 1937, or 35.5 per cent; by river transportation—from 43,600,000 passengers in 1932 to 74,000,000 passengers in 1937, or 69.7 per cent. The projected increase in freight and passenger traffic will fully satisfy the demands of the entire national economy, will make it possible greatly to increase the utilization of the productive forces of the country in every respect and will augment all transportation facilities between town and country.

During the Second Five-Year Plan period the technical reconstruction of transportation must be completed. This will considerably increase carrying capacity. The tremendous growth achieved in the manufacture of transportation equipment, putting in service 2,375 powerful freight locomotives of the "FD" type, 255 powerful passenger locomotives of the "JS" type, 350 electric locomotives and 248 Diesel locomotives, coupled with the huge increase in the

output of heavy freight cars and automatic dump-cars, the complete equipping of freight trains with automatic brakes and of not less than half of the railroad cars with automatic couplings, the radical reconstruction of the trunk line railroads, the adoption of the automatic block-signal system on the trunk lines and the wide application of electricity are all radically changing the technical base of railroad transportation.

The Plan contemplates the building of 14,500 km. of new railroad lines. Of these 11,000 km. are to be put in operation during the course of the Second Five-Year Plan period. Railroad lines thus grow in length to 94,000 km. In addition the Plan projects the construction of second tracks for a length of 9,500 km.

The erection of a big new trunk line from Moscow to the Donetz Basin provides a new outlet for the heavy freight traffic from the eastern section of the Donetz Coal Basin. The laying of second tracks and the construction of new railroad lines, from Bryansk to Vyazma, and from Smolensk to Soblago, create new trunk lines uniting the Donetz Basin with Leningrad. Communication between the southern districts and the Northeast is extended by the laying of second tracks from Valuiki to Penza and Syzran.

The radical reconstruction of the trunk lines supplying outlets from the East to the Central Area, and the vast development of the transportation network of the Ural-Kuznetsk Combination will be of great importance. The construction of the Baikal-Amur trunk line and of the first section of the Lena Railroad will play a great part in the development of the productive forces and the exploitation of the natural wealth of the Far East and of the Far Northeast.

During the Second Five-Year Plan period the electrification of the railroads will be a powerful factor in reconstructing the most congested sections of freight and passenger traffic. The railroads of the Donetz Basin and the Urals are being radically rebuilt by the introduction of electrification. The total length of electrified railroad lines will reach 5,050 km.

The reconstruction of waterway transportation is being carried out on a huge scale. Parallel with the development of the existing waterways—the Volga, the Dnieper, etc.—considerable progress is being made in opening waterways to navigation in districts where they are frequently the sole means of communication, such as in the Far Eastern Territory, West and East Siberia and the Northern Region, etc. The total extent of navigable natural waterways will increase 20 per cent.

This is the first time that artificial waterways are being constructed on so large a scale. The opening to navigation, during the first year of the Second Five-Year Plan period, of the White Sea-Baltic Canal, the construction of the Volga-Don and the Volga-Moscow Canals and the reconstruction of the Mariinsk System will connect the principal waterway transportation channel, the Volga, with the open sea. Moscow, the biggest railroad centre of the Union, is becoming a big river-port linked up with the principal Soviet waterways.

The improvement of the waterway facilities has likewise received considerable attention. For this purpose the construction of new river and sea-ports is being projected and the mechanization of loading and unloading operations is being realized on a large scale.

Enlarging the tonnage of the fleet is the principal item in the reconstruction of waterway transportation.

The freight carrying capacity of the maritime fleet is increasing by more than 74 per cent. The type of ships used is itself undergoing considerable change as a result of improved and more modern construction. Turbo-electric ships are being built for the first time.

The number of cutters and watercraft for technical purposes is growing considerably. The projected increase in the maritime fleet makes it possible to carry all import and coastwise shipments in Soviet bottoms; the volume of export freight carried in Soviet bottoms is also considerably increasing.

To cope with the tremendous increase in the number of motor vehicles, the Plan maps out a vast program of road building and highway construction. According to the Plan the total mileage of all highways will exhibit an increase of 210,000 km. which will include 30,000 km. of stone-surfaced roads. Local road building by collective farms is also increasing considerably.

Airway transportation is undergoing vast development during the Second Five-Year Plan period. Passenger airway traffic is multiplying 24.4 times, air mail—159.4 times, airway express shipments—59.3 times. The network of State airway lines is to increase almost 3-fold (up to 85,000 km.). Local aviation for postal, administrative and business purposes will also be greatly expanded. These lines will be extended to no less than 35,000 km. by the end of the Second Five-Year Plan period.

National communication is undergoing considerable recon-

struction and the quality of the communication service supplied to national economy is improving. Telephonic communication is being established between all district centres and their respective rural Soviets, and the inter-urban telegraph and telephone network connecting centres of republics, territories and regions is being developed. Radio and telephone service intended to facilitate production on the State farms and the machine and tractor stations is spreading considerably.

Radio communication is growing apace. The manufacture of radio receiving sets is multiplying more than 17 times, the capacity of mainline radio telegraph and telephone broadcast transmitters is growing 3.6 times. Radio communication is finding vast application in the operation of railway and waterway transportation, in agriculture and in other branches of national economy.

V

The completion of technical reconstruction in the whole of national economy and the projected quotas of output assigned to industry, agriculture and transportation necessitate a tremendous construction program during the Second Five-Year Plan period. The Second Five-Year Plan contemplates capital investments during the five-year period totalling 133,400,000,000 rubles, *i.e.*, 2.6 times as much as during the First Five-Year Plan period. Investments in industry during the Second Five-Year Plan period constitute 69,500,000,000 rubles as against 24,800,000,000 rubles during the First Five-Year Plan period, *i.e.*, are multiplying 2.8 times. Capital investments in socialized agriculture during the Second Five-Year Plan period are 57 per cent higher than during the First Five-Year Plan period, reaching 15,200,000,000 rubles. Total capital investments in railroad transportation will rise to 17,400,000,000 rubles, surpassing the corresponding expenditure during the First Five-Year Plan period 2.7 times.

The Plan contemplates a considerably accelerated rate of increase of capital investments in those branches of industry which manufacture articles of general consumption. While capital expenditures for Group "A" [1] during the five-year period will increase 151.0 per cent, capital expenditures in the industries comprising Group "B" [2] will increase 360.4 per cent in comparison with the

[1] Group "A" comprises the production of means of production.
[2] Group "B" comprises the production of articles of consumption.

corresponding capital expenditures during the First Five-Year Plan period.

The construction plan for the Second Five-Year Plan period contemplates the realization of a tremendous program. It specifies that huge new structures be opened for use and that simultaneously a new series of enormous constructions be started which will not be opened for exploitation until after the Second Five-Year Plan period. The number of newly constructed enterprises to be opened for use will be especially great in industry where the increase will be 3.4-fold, while the volume of construction for the Second Five-Year Plan period exceeds that of the first quinquennium 2.8 times.

The realization of the projected construction program will guarantee the gigantic growth of the productive and technical power of the Soviet Union and makes certain that the technical base of national economy will be considerably renewed. The fixed capital of national economy as a whole is increasing 2.3-fold while that of industry is increasing 3-fold. The fixed capital of the machine and tractor stations is multiplying 6 times and that of transport 2 times.

Construction for cultural and social purposes is making great headway. Investments in urban housing and in dwelling construction reserved for the workers of particular factories are multiplying 3 times, in municipal service construction—3.9 times, for educational purposes—3.5 times and for health protection—4.8 times. Capital investments in municipal service, housing and cultural construction will constitute about one-fourth of the total capital to be invested in the national economy of the U.S.S.R. during the Second Five-Year Plan period.

The immense construction program of the Second Five-Year Plan period, the new enterprises being put into operation and the reconstruction of enterprises already in operation are sharply increasing the production capacity of the principal branches of national economy. The construction of a number of new blast furnaces and mastery of the technique of the blast furnaces built during the First Five-Year Plan period will yield a 2.1-fold increase in the total volume of blast furnaces in the iron and steel industry. The sinking of new pits and completing the sinking of pits carried over from the First Five-Year Plan period will more than double the mining capacity of the coal industry. The capacity of the regional electric power stations of the Union is increasing more than 2.5-fold. The considerable increase in the capacity of the

Gorky Automobile Plant, the reconstruction and extension of the Stalin Automobile Plant in Moscow and of the Yaroslavl Plant, parallel with the construction of new automobile plants will increase the capacity of the automobile industry 3.9-fold by the end of the Second Five-Year Plan period. Starting new locomotive works and mastering the technique of these works in conjunction with the reconstruction of works already in operation will increase the capacity of this branch of machine production 3.2-fold and of railroad car building 3.9-fold. The capacity of the branches of light industry and the food industry is showing a sharp increase—1.5-fold in the cotton-goods industry, more than 2-fold in the linen-goods industry, 2-fold in the footwear industry, 1.4-fold in the sugar industry and 2.5-fold for the big meat packing plants.

The realization of the construction program mapped out for the Second Five-Year Plan period is bringing the U.S.S.R. to first place in Europe not only in total of output but also in the capacity of the country's production apparatus.

During the Second Five-Year Plan period a new geographic distribution of the forces of production is being made. As a result of the First Five-Year Plan the old division of regions into industrial and agrarian became obsolete, as Stalin pointed out at the Seventeenth Party Congress. During the Second Five-Year Plan period all regions are becoming industrial to a still greater extent than heretofore. The construction of the Ural-Kuznetsk Combination is being completed. New metallurgical bases are being established in the Far East, East Siberia, the Middle Volga Territory and in the Central Area. A powerful impetus is being given to the development of the new coal basins—Karaganda in Kazakstan, the coal districts of Transcaucasia, Central Asia, the Far Eastern Territory, East Siberia and Pechora—so that their relative importance as factors in the country's fuel supply is considerably increasing. The new oil districts are also rapidly raising their output. Large machinery plants are growing up in the Urals; machinery production bases are being established in Central Asia, Transcaucasia, the Tatar Republic and other districts. A powerful new chemical industry is springing up in Central Asia and Transcaucasia, simultaneously with the development of the chemical industry in the Urals and the central districts. Big electric power stations are being built in the Urals, on the Volga, in Siberia, on the Kola Peninsula, in Kazakstan, Central Asia, Transcaucasia and the Far Eastern Territory.

The great construction operations in the light industry of Central Asia and West Siberia render these regions large bases for the cotton, knit-goods and woollen industries. The construction of a number of enterprises in the light industry of Kazakstan, Transcaucasia, West Siberia, White Russia, the Western Region, Bashkiria, the Tatar Republic and elsewhere; the creation in these districts of new centres for the manufacture of footwear, linen goods, for the needle-trade industry and the manufacture of cottonine goods; the development of a number of branches of the food industry in the districts where the raw material is being produced; the new bases for the sugar industry in Siberia, Kirghizia, Kazakstan, etc., in addition to the development of the old industrial centres, all characterize the new geographic distribution of industry during the Second Five-Year Plan period and bring new industrial centres into being.

The triumph of large-scale agriculture ensures the rational geographic distribution and specialization of agricultural production. The old division of regions into solely consumptive and solely productive can now be discarded as obsolete. The new cotton bases in Transcaucasia and the Urals, the new sugar beet bases in Siberia, Central Asia, Transcaucasia and the Far East are developing at a rapid rate. The cultivation of great stretches of grain fields in districts that were in the consumers' column, and the beginning of irrigation work in the arid districts of the Trans-Volga Area to secure stable grain growing in these regions are of great importance. The sub-tropical districts of Transcaucasia and Central Asia are being rapidly developed.

The socialist reconstruction of agriculture has created new economic and political centres in the countryside in the form of State farms and machine and tractor stations. The increase in the number of machine and tractor stations during the Second Five-Year Plan period to a total of 6,000 and the inclusion of all collective farms in the service they provide complete the economic regionalization of the country.

The new industrial centres which draw the gigantic natural wealth of the national districts into the orbit of industrial exploitation, and the completion of the economic regionalization of the country on the basis of a system of machine and tractor stations which are more than doubling the number of their units are effecting a new territorial distribution of the population.

The bringing of industry nearer to the sources of raw material

and power, the specialization of the agricultural regions so as to ensure the most effective utilization of the climatic and soil conditions of any particular district, the extension of the transportation network and the rapid economic development of the national republics and regions, which makes certain that their economic and cultural backwardness will be overcome during the Second Five-Year Plan period, are the practical realization of the precepts laid down by the founders of Marxism-Leninism on the creation of a new, socialist system of the geographic distribution of productive forces to meet the exigencies of the construction of classless, socialist society.

VI

"The mastery of the new technique and of the new production processes must be the decisive condition for the completion of the technical reconstruction of national economy." (*Resolution of the Seventeenth Congress of the Communist Party of the Soviet Union.*)

In accordance with this Plan a considerable rise in the technical and production indices of the work of industry has been projected.

Thus the coefficient of volumetric efficiency of blast furnaces is improving during the Second Five-Year Plan period, falling from 1.75 to 1.2 in comparison with the First Five-Year Plan period. The average steel output per square metre of open-hearth bed in the Steel Association enterprises is rising from 2.97 tons in 1932 to 4.12 tons in 1937, in the Ural factories—from 2.37 tons to 3.65 tons. The use factor of the capacity installed at the regional electric power stations is increasing from 3,460 hours annually in 1932 to 4,200 hours in 1937. In coal mining the output per cutting machine is doubling.

The utilization of production capacities is rising considerably. In a number of branches of industry the rates of increase of output are exceeding the rates of increase of fixed capital. The mastery of the new technique finds its expression also in the improvement of the organization of labour and the establishment of a normal production regime at the various enterprises.

The increasing mastery of the new technical base during the Second Five-Year Plan period is finding its ultimate expression in the increasing productivity of labour and the decreasing cost of production. Whereas the 2.2-fold increase in industrial output achieved during the First Five-Year Plan period was accompanied by a 91.9 per cent increase in the number of workers and em-

ployees in large-scale industry, the Second Five-Year Plan contemplates a 2.2-fold increase in large-scale industry which will necessitate a rise of only 29 per cent in the number of its workers and employees. Of the increase in the output of industrial production during the Second Five-Year Plan period 68.3 per cent must be derived from improved labour productivity.

Mastering the operation of the new technical equipment in all branches of national economy and increased labour productivity are the basic factors that ensure lower production costs. The Plan projects a 26 per cent reduction in the cost of production in industry, thus carrying out Stalin's directions concerning the need of making heavy industry a more important source of accumulation in national economy.

The organizational and economic consolidation of the State farms, the machine and tractor stations and the collective farms as well as the mastery of the new technique by all these organizations likewise represent an important task.

The use made of the new equipment in agriculture—the tractors, harvester-combines, motor vehicles, etc.—must be considerably extended. In this respect special attention must be paid to the quality of repairs, primarily partial and small repairs.

The mechanization of the principal agricultural processes requiring much labour and traction will make it possible to distribute the expenditure of labour power and the use of draft animals more evenly throughout the year and will ensure the possibility of complying with all the requirements of scientific agriculture on scheduled time and with due regard to quality of work. The determined struggle to shorten the time limits within which sowing and harvesting must be completed, the struggle for cultivating industrial crops at the proper time, the introduction of rational crop rotation on all collective and State farms, the mastery of the powerful technical equipment of the State farms and the machine and tractor stations, the vastly increasing use of chemicals as fertilizers to ten times the former quantity, as well as the use of chemicals to combat agricultural pests will ensure during the Second Five-Year Plan period an increase in the grain crop to a total yield of 10 centners per hectare, in irrigated cotton—to a total yield of 12 centners, in flax fibre—3.7 centners and in sugar beet—200 centners.

The increase in the gross output of grain crops, which amounts to more than 85 per cent, must be attained through increased yield,

which will make it possible considerably to lower the cost of production of agricultural products.

The results of 1933 showed how successfully agricultural yield can be increased if there is an all-sided improvement in the quality of Bolshevik leadership, the organizational and economic consolidation of the collective and State farms and of the machine and tractor stations, and if socialist labour discipline is strengthened.

The central task of mastering the new technique, the operation of the new enterprises, applies also to transportation. The extensive application of new types of traction (electric and Diesel engines), the introduction of powerful steam locomotives and the vast development of new modes of communication squarely confront the transportation system with the task of assimilating this new technical equipment. Only on this basis can the projected increase in labour productivity be attained and the task of lowering the cost of production be accomplished.

During the Second Five-Year Plan period a radical improvement in the quality and variety of output must be achieved. Improved quality and greater variety in manufactured articles of general consumption present very important problems of national economy, upon the solution of which depend not only the improvement of the material welfare of the toilers but also the rates of development of the whole of national economy.

The solution of the cadre problem is the main factor in solving the problem of mastering the new technique during the Second Five-Year Plan period. Therefore the successful mastery of the technique of the new enterprises is only possible if the growing power of the new technical equipment is attended by a corresponding increase in skilled workers capable of coping with this new technical equipment. In the mastery of technique "much time is required to raise the qualifications of the workers and the engineering and technical personnel and to acquire the experience needed to fully utilize the new technique." *(Resolution of the Joint Plenum of the Central Committee and Central Control Commission of the Communist Party of the Soviet Union, January, 1933.)*

Therefore during the Second Five-Year Plan period particular attention must be paid to the final solution of the problem of creating a Soviet proletarian technical intelligentsia and of improving technical education in the country. The number of specialists graduated by universities must rise from 170,700 during the First Five-Year Plan period to 340,000 during the Second Five-Year

Plan period. The number of specialists graduated by middle technical schools must increase to 850,000 as against 308,000 during the First Five-Year Plan period.

In order to increase the number of skilled workers the Five-Year Plan provides for the training of about 5,000,000 persons employed in trades of a mass character, inclusive of more than 1,500,000 skilled workers for agriculture (tractor and harvester-combine drivers, etc.) and more than one million skilled transport workers (inclusive of 700,000 chauffeurs), which will considerably increase the number of skilled workers in all branches of national economy.

The compulsory acquisition of a minimum of technical knowledge by the workers as one of the forms of mastering modern technique becomes increasingly important in this connection.

The struggle to fulfil the qualitative indices,[1] to master the new technique and train new cadres capable of coping with this technique must to an increasing extent be made the central point of all practical work during the Second Five-Year Plan period, as the fulfilment of the Second Five-Year Plan depends upon success in this field.

The entrenchment of cost accounting and of control through the ruble, the strengthening of plan and finance discipline and the further consolidation of the Soviet ruble—this most important factor in reinforcing cost accounting and strengthening the economic ties between town and country—represent the mainspring in the struggle for the better organization of production and the lowering of its costs.

VII

The 2.5-fold increase in the output of light industry and the food industry, the doubling of the output of agriculture concomitant with a still higher rate of increase in livestock products, the 2.5-fold rise in commodity circulation and the huge program of construction for cultural and social purposes establish all the conditions necessary for a radical improvement in the material standards and cultural conditions of the working class and the peasantry.

The more than 2.5-fold rise in the resources of manufactured articles of general consumption intended for the market, comparing 1937 with 1932, the 2.6-fold growth of public catering and the

[1] Qualitative indices are cost of production and rate of output per worker.

2.3-fold rise in food product resources for the market will bring about a 2 to 3-fold rise in the consumption level of the toiling population. In 1937 the average per capita consumption of food products will rise 2.5-fold in the case of meats, fats, eggs, sugar and fish, as compared with 1932.

The average per capita consumption of manufactured goods will likewise undergo a considerable increase: 1.8-fold for cottons, 2.2-fold for woollens, 12-fold for linens, 3.4-fold for knit goods and 2-fold for footwear.

The annual average number of workers and employees included in the urban public catering system is rising from 13,100,000 in 1932 to 27,600,000 in 1937, while the total number of dishes served in urban and rural dining rooms will increase 2.6-fold by 1937.

The increased resources of State and collective farm trade and the development of commodity circulation are laying the ground for the abolition of the rationed distribution of commodities. The system of centralized distribution is being replaced by fully developed Soviet trade. The trading organizations during the Second Five-Year Plan period are confronted with the task of expanding the trading system to the utmost, of carrying out its necessary technical reconstruction, of moving manufactured commodities of general consumption more rapidly and of introducing cultural methods throughout Soviet trade.

The development of Soviet trade will be the main lever operating for lowering prices in collective farm trade to one-third or one-fourth of the present level. The State and co-operative retail prices will be lowered by 35 per cent through a reduction in the cost of production and expenses of distribution.

The lowering of the prices of manufactured articles of general consumption will in turn be highly instrumental in raising the real wages of the working class and increasing the income of the collective farmers.

The 2.0-fold increase in the workers' and employees' consumption of food products, the 2.1-fold increase in their consumption of manufactured goods in general use, the tremendous increase in personal expenditures for cultural and educational purposes, the 2.5-fold increase in the expenditures of the State for medical service, cultural purposes, etc., the 35 per cent reduction in retail prices and the rise in absolute wages commensurate with the rise

in the level of skill of the workers and employees will ensure a 2-fold increase in real wages.

J. Stalin's slogan that the standard of living of all collective farmers be raised to that of well-to-do husbandmen is being realized on the basis of the Bolshevik consolidation of the collective farms and the tremendous upsurge in agriculture during the Second Five-Year Plan period.

By the end of this period the collective farmers will have at their disposal a greater average quantum of means of production per household and a considerably higher technical level of these means of production than the well-to-do farms possessed before collectivization. The gross and net per capita output of the collective farmers will surpass that of these well-to-do farmers to a still greater extent. The gross per capita output on the collective farms will exceed the level of the well-to-do individual farms by 18 to 20 per cent. Thus by the end of the Second Five-Year Plan period the level of the entire collective farm peasantry will be considerably higher than that of the well-to-do individual farms which before collectivization constituted only an insignificant portion of the countryside.

The considerable volume of new industrial construction in the new as well as in the old industrial centres urgently raises the question of reconstructing a number of cities during the Second Five-Year Plan period and of simultaneously intensifying urban construction at such points as are newly arising or have newly arisen.

Moscow, Leningrad, Kharkov, Tiflis, Baku, Gorky, Rostov, Stalingrad, Sverdlovsk, Stalino, Lugansk, Novosibirsk, Chelyabinsk, Ufa and other cities are being transformed in their entirety into well laid-out urban centres. In thousands of cities and industrial settlements large operations will be carried out during the Second Five-Year Plan period in the way of city planning, street paving, the planting of greenery, the improvement of urban transportation, water supply, sewerage, etc.

Capital expenditures on urban housing and dwelling construction reserved for the workers of particular factories are increasing from 4,000,000,000 rubles during the First Five-Year Plan period to 12,500,000,000 rubles during the Second Five-Year Plan period. The total housing space is growing from 185,000,000 sq. metres to 246,500,000 sq. metres, an increase of 61,500,000 sq. metres. In the key industries of national economy, housing space is made

available at still more rapidly growing rates. Thus the standard floor space per person in the coal industry is being increased from 3.5 sq. metres on the average in 1932 to 7 sq. metres in 1937. In the iron and steel industry the floor space occupied by workers and employees is rising on the average from 4.5 sq. metres to 6 sq. metres per person for the same years; in the machinery industry—from 4.9 sq. metres to 6 sq. metres.

The Plan maps out a vast development of municipal service, capital investments in which are multiplying 3.9 times. All cities having a population exceeding 10,000 will be provided with waterworks; cities having a population of 50,000 or more will be provided with a sewage system. During the Second Five-Year Plan period street car lines will be built in 20 cities that had none before. In 83 cities regular auto bus service will be installed and the total number of taxis will increase considerably. During this period also the first subway in the U.S.S.R. will be put in operation in Moscow.

Expenditures for the preservation of the health of the toilers are rising sharply. The number of hospital beds in the cities is increasing 44 per cent, in the villages—98 per cent.

The Second Five-Year Plan is a plan that will score signal victories for the cultural revolution. During the Second Five-Year Plan period not only will illiteracy among the population of the Union and semi-literacy among the able-bodied adult population be completely abolished throughout the land, but the universal compulsory elementary education already in effect is being supplemented by universal compulsory seven-year polytechnic education. The number of students in schools of all kinds exclusive of pre-school education is increasing from 147 per thousand persons in 1932 to 197 per thousand in 1937.

The total number of students in elementary and secondary schools is growing from 21,700,000 to 29,900,000. The floor space allotted to schools is increasing almost 50 per cent. Newspaper circulation is mounting from 35,500,000 to 66,000,000, the number of printed sheets of books and magazines—from 3,300,000,000 to 6,900,000,000. Scientific and research workers are growing considerably in number.

Giants of culture like the All-Union Institute of Experimental Medicine, the Palace of Technique and the Palace of Soviets are being erected for the first time during the Second Five-Year Plan period.

The carrying out of extensive sanitary measures concomitantly with the considerable rise in material and cultural standards is leading to a further decrease in mortality and increase in birthrate, as a result of which the total population will rise from 165,700,000 persons in 1932 to 180,700,000 persons in 1937.

* * *

The Second Five-Year Plan period will go down in history as the epoch of the final abolition of capitalist elements and of classes in general, the epoch of the abolition in the U.S.S.R. of the private ownership of the means of production, as the epoch of the practical realization of the teachings of the best minds of humanity and of the aspirations of the oppressed classes of the capitalist world.

The Second Five-Year Plan period is the period of the overcoming of the remnants of capitalism in economic life and in the minds of people, and of the strengthening of socialist labour discipline.

The Second Five-Year Plan period will go down in history as the epoch of the victory of the working class of the U.S.S.R. in the mastery of the most modern machine technique, of the further industrialization of the country and of the tremendous development of its productive forces. In solving the tasks set by the Second Five-Year Plan, the U.S.S.R. is moving to first place in Europe in point of technique, is outdistancing the advanced capitalist countries of Europe in the absolute volume of output, in the capacity of its production apparatus, and in a number of branches of economy is realizing the slogan of "overtaking and surpassing the advanced capitalist countries both technically and economically." The U.S.S.R. is thus becoming a technically and economically completely independent country, and is raising its defensive strength to so high a level that it will be able to repulse with crushing force any encroachment by the enemy upon the first socialist country in the world.

The Second Five-Year Plan is bringing with it a radical improvement in the material and cultural conditions of the masses—the builders of socialist society. In fact, the uninterrupted rise of the standard of living of the Soviet toilers is the most striking manifestation of the endless succession of new victories of the socialist system which give the toilers of the whole world an object lesson in what the working class is capable of accomplishing when creating socialist, classless society.

This consolidation of the might of the U.S.S.R. is raising its prestige still higher among the proletarians of all countries and the toilers of the colonial peoples, since each new success demonstrates new possibilities of unlimited development in the first country of socialism, and contrasts strikingly with the decay and decline pervading the capitalist world.

The stupendous historical tasks embodied in the Second Five-Year Plan can only be accomplished if all forms of resistance by the fragments of the classes hostile to the Soviet system and of their agents will be resolutely crushed. The activity, the creative will and the labour enthusiasm of the millions of workers and collective farmers, and the tested leadership of the Leninist Party and of J. Stalin, its leader, are the forces that guarantee the successful completion of the Second Five-Year Plan for the Development of the National Economy of the U.S.S.R.

COMPLETION OF TECHNICAL RECONSTRUCTION IN NATIONAL ECONOMY

I

THE completion of technical reconstruction in the whole of national economy is "the fundamental and decisive economic task of the Second Five-Year Plan." The fulfilment of this task assures the tremendous growth of the productive forces and with this as a basis provides for the abolition of the remnants of the capitalist elements and of classes in general.

Under the Second Five-Year Plan the task of new construction must be supplemented by that of mastering all aspects of the operation of the new enterprises and the new technique. The mastery of the new technique, of the operation of the new plants, the considerable improvement of labour productivity, the lowering of production costs and the decided improvement in the quality of output have become the main tasks in developing further the productive forces of socialism, in raising further the material and cultural level of the toilers of town and country.

Lenin pointed out that in order to win, in order to realize and consolidate socialism, it is necessary to bring into being a new organization of labour, combining "the last word in science and capitalist technique with the mass association of conscious workers, creating large-scale socialist production." (Lenin.) To achieve the final victory of socialism, it is necessary "to overtake and surpass the advanced technique of the developed capitalist countries." (Stalin.)

With the completion of technical reconstruction of the entire national economy the struggle between the two systems—capitalism and socialism—is raised to a new plane. Under the Second Five-Year Plan the U.S.S.R. is achieving complete economic independence. As regards the technical level of its national economy as a whole, the U.S.S.R. will attain first place in Europe. As regards the technical level of agriculture and, in numerous instances, the technical basis of industry and transport, it will rank first in the world.

The new great step forward in the development of the country's productive forces and the introduction of the latest technique provide the prerequisites for a tremendous increase in the volume

of industrial output during the period of the second quinquennial Plan. The consolidation and development of heavy industry ensure that the extensive construction program of national economy will be carried out with domestic technical resources.

The general growth of industrial output under the Second Five-Year Plan is presented in the following table:

Classification	1932	1937	1937 in % of 1932	Average annual rate of increase (in %)
	(in million rubles)			
Total industrial output in fixed 1926-27 prices	43,300	92,712	214.1	16.5
of which:				
Group "A"	23,100	45,528	197.2	14.5
Group "B"	20,200	47,184	233.6	18.5
P. C. of Heavy Industry	14,279	33,500	234.6	18.6
P. C. of Timber	1,800	3,600	200.0	14.9
P. C. of Light Industry	7,832	19,500	249.0	20.0
P. C. of Supply	4,635	11,870	256.1	20.7

The total output of industry is more than doubling during the years of the Second Five-Year Plan period. The output of large-scale and technically most advanced industry (under the People's Commissariat of Heavy Industry) is increasing at a particularly rapid rate—2.3 times. The output of industry under the People's Commissariat of Light Industry is increasing at an even more rapid rate—2.5 times, and that under the People's Commissariat of Supply—2.6 times.

Bearing in mind that the so-called "pre-war level" was regained by Soviet industry in 1926-27, the fulfilment of the Second Five-Year Plan will mean that in the 10 years from 1926-27 to 1937 socialist industry will rise to approximately 8 times as high an industrial level as was attained by tsarist Russia in 1913.

In view of the difficulties of mastering the technique of the new factories and new manufactures, which will supply the main share of the output in the Second Five-Year Plan, the development of production is planned at less accelerated rates than in the first period. As compared with the 21-22 per cent average annual rate of increase in industrial output for the First Five-Year Plan period, the average annual rate of increase in output for all industry of the U.S.S.R. will amount to 16.5 per cent during the second quinquennial period.

However, in comparing the rates of increase in industrial output in the First Five-Year Plan with those for the Second Five-Year Plan, it is necessary to take into account the absolute increase in output represented by these percentages. Thus in the First Five-Year Plan, 1 per cent of growth of industrial output represented 170,000,000 rubles in 1929, and 386,000,000 rubles in 1932; in the Second Five-Year Plan, 1 per cent of growth of output represents 433,000,000 rubles in 1933 and 770,000,000 rubles in 1937.

With so tremendous an increase in volume of industrial output under the Second Five-Year Plan as compared with the First Five-Year Plan, the structural composition of industrial production will also change essentially. While in the First Five-Year Plan period the average annual rate of increase in the production of means of production was 26.6 per cent and the average annual rate of increase in the production of articles of consumption was 17 per cent, during the Second Five-Year Plan period the rates of increase in the production of articles of consumption will substantially exceed the increase in the production of means of production (18.5 per cent and 14.5 per cent, respectively).

The decisive portion of industrial output in the Second Five-Year Plan period will come from large-scale State industry under the jurisdiction of the industrial People's Commissariats.[1] Parallel with this, the handicraft co-operative organizations and the undertakings of the other People's Commissariats (for instance, the People's Commissariat of Transportation and People's Commissariat of Communication), of the State and collective farms and especially local State industry will undergo great development, raising their total output 2.5-fold and their output of general consumption manufactures 3-fold during the Second Five-Year Plan period.

The Five-Year Plan provides for such a development of these types of industry as will ensure close co-operation between these industries and large-scale State industry, supplementing the latter in various directions. Such is the role played in the Plan by the handicraft co-operative organizations utilizing local sources of raw material and specializing in the manufacture of a wide variety of miscellaneous articles for general consumption.

[1] The industrial People's Commissariats are the following: The People's Commissariats of Heavy Industry, of Light Industry, of Supply and of Timber.

The undertakings of the non-industrial People's Commissariats are to specialize in general overhauling and partial repairs as well as in the manufacture of spare parts for their machines and appliances, thereby leaving the personnel and the resources of large-scale State industry free for the mass production of new manufactures.

Local industry, which will be strengthened by transferring to the jurisdiction of local agencies a number of undertakings now under that of the industrial People's Commissariats, will play a very important role in the development of the production of manufactured articles for general consumption, both by exploiting local sources of raw material and by organizing the utilization of waste products. Fullest encouragement of the initiative of the local organs in this matter is an absolute prerequisite of the fulfilment by local industry of its task to satisfy the growing demands of the toilers.

The completion of the technical reconstruction of national economy gives heavy industry the task of outfitting the whole of national economy with the latest technique, with a comprehensive assortment of most modern and most advanced equipment. Heavy industry must increase the volume of its output more than 2-fold, must organize the production of hundreds of new manufactures, by extending and remodelling its production apparatus on a wider scale, by mastering advanced technique.

The Plan projects the following increase in output for the main branches of heavy industry: (See table p. 97.)

By enormously strengthening the power and fuel bases of national economy the Plan aims at completely overcoming the lag of the metal industries behind the growing needs of national economy. This will be accomplished on the basis of an almost 3-fold increase in the manufacture of steel and rolled products and the development of the non-ferrous metal industry to the dimensions required to meet the country's demand for these metals. At the same time the Plan stresses the development of the branches of heavy industry which play a decisive role in the completion of technical reconstruction in national economy. Thus, while the output of the machinery industry under the People's Commissariat of Heavy Industry will multiply 2.2 times, the manufacture of transportation equipment will multiply 3.1 times, the production of tractors (in thousand h.p.)—3.2 times, of motor vehicles—8.4 times, of machine-tools, instruments and

Classification	Units of measurement	1932	1937	1937 in % of 1932
Electricity	million kwh.	13,390	38,000	283.8
Coal	million tons	64.33	152.5	237.0
Crude oil and natural gas	„ „	22.27	46.8	210.1
Pig iron	„ „	6.16	16.0	259.9
Steel	„ „	5.9	17.0	289.0
Rolled metal	„ „	4.29	13.0	303.1
Copper	thousand tons	46.6	135.0	289.7
Metal products	million rubles in 1926-27 prices	9,410	19,500	207.2
Metal-working machine-tools	thousands	15.0	40.0	266.7
Harvester-combines	„	10.0	20.0	200.0
Automobiles	„	23.9	200.0	837.0
Freight and passenger locomotives (in type "E" and "SU"[1] equivalents)	units	828	2,800	338.2
Freight cars (in 2-axle equivalents)	thousands	22.3	118.4	530.9
Chemical industry of the P. C. of Heavy Industry	million rubles in 1926-27 prices	1,497	4,099	273.8
of which:				
Products of basic branches of heavy chemical industry (exclusive of mined chemical raw materials)	million rubles in 1926-27 prices	184	910	494.9
Cement	thousand tons	3,481.0	7,500.0	215.5

[1] "E" type = 0—5—0 freight locomotive.
"SU" type = 1—3—1 passenger locomotive.

hand tools—3.4 times, of power-generating equipment and electrical machinery—2.3 times, of equipment for the textile industry —almost 6 times, etc. Soviet machinery production, which already at the beginning of the Second Five-Year Plan period overtook the foremost countries of Europe and attained second place in the world in volume of output and technical level, will in the course of this period, through its own resources, fulfil the historic task of technically re-equipping all branches of national economy.

The output of the chemical industry as a whole is increasing 2.7 times, that of the principal branches of the heavy chemical industry jointly with the mined chemical raw materials industry—5.4 times. This tremendous leap forward will mean the complete elimination of the lag of the chemical industry behind the needs of national economy, and its progression to a foremost place among the other branches of heavy industry. By mastering the latest tech-

nical methods in the manufacture of synthetic ammonia, sulphuric acid and soda, and by developing new items of production under the Second Five-Year Plan the chemical industry will serve as a most important factor in technical reconstruction. It will be the basis of the program providing for the vast application of chemistry in national economy.

The program adopted in the Plan for the development of the fuel and power bases is of very great importance. The more than 2-fold increase in the country's fuel resources will, while especially accelerating the development of the petroleum products industries, provide a firm foundation for carrying out the tasks of the production program and will ensure the accumulation of the necessary fuel reserves. The 2.8-fold increase in the generation of electric power, a rate of growth considerably in excess of that for industrial production as a whole as well as of agriculture and transportation, shows how marked will be the increase in the amount of power supplied to national economy, in the use of electricity for technological processes—shows the shifting of the country's economy to the most modern source of power.

The shift in the structural composition of industrial output in the direction of greater stress on those branches most essential to the completion of the technical reconstruction of the entire national economy will find its most general form of expression in a rise in the proportion which machinery manufacturing and the production of the basic branches of the heavy chemical industry and of the regional electric power stations of the People's Commissariat of Heavy Industry constitute of the total of heavy industry—a rise from 39.8 per cent in 1932 to 44.5 per cent in 1937.

Under the Second Five-Year Plan the scale of the technical re-equipment of the principal branches of national economy based on the growth of production in heavy industry is shown by the following data:

During the quinquennial period the railroad transportation system will receive from industry 5,861 freight locomotives, including 2,375 high-power locomotives of the "FD" type. As a result the number of freight locomotives possessed by the railroads is increasing (in type "E" equivalents) from 12,100 units in 1932 to 18,400 units in 1937, *i.e.*, by 52.0 per cent. The number of passenger locomotives is increasing at an even more rapid rate. During the five-year period transportation will get from industry 1,885 passenger locomotives, of which 255 will be high-power

type "JS" locomotives having a hauling capacity more than one and a half times that of the type "SU" passenger locomotive. Moreover, during the five-year period industry will provide transportation with 350 trunk line electric locomotives and 248 Diesel locomotives. As a result the total number of passenger locomotives (in type "SU" equivalents) is increasing from 2,800 units in 1932 to 4,600 units in 1937, *i.e.*, to 164.2 per cent of the former figure.

In the Second Five-Year Plan period, industry will considerably increase the stock of railroad cars. During the five-year period 273,000 "NKPS"[1] freight cars (in 2-axle equivalents) will be supplied by industry to transportation. Taking into account the change in the load capacity of the freight car, the total load capacity of freight cars is rising during the five-year period from 9,500,000 tons in 1932 to 15,800,000 tons in 1937, *i.e.*, 166.3 per cent of 1932.

During the Second Five-Year Plan period the transportation system will receive from industry 3,700,000 tons of first grade rails, or almost three times the amount supplied in the First Five-Year Plan period. This ensures the fulfilment of the extensive program for reconstructing the network now in operation, likewise the completion of new railroads having a total length of 14,500 km.

The indicated measures for the material and technical equipment of railroad transportation provide all the necessary prerequisites for completely overcoming the backwardness of that branch of national economy. The vast expansion of industry's technical base ensures the reconstruction of waterway transportation. The carrying capacity of the self-propelled river fleet is increasing by 49 per cent and that of the maritime merchant fleet by 74.1 per cent.

Simultaneously there will be a marked growth of local transportation, first and foremost an increase in the number of motor vehicles. During the five-year period 571,500 motor vehicles including 146,200 passenger cars will be produced. The total number of motor vehicles is growing from 75,400 in 1932 to 580,000 in 1937. So rapid an increase will greatly raise the importance of the automobile in the transportation system of the country.

Finally, there will be a further radical change in the technical equipment of transportation under the Second Five-Year Plan as

[1] People's Commissariat of Transportation.

a result of the mighty air fleet which the transportation system is receiving from industry.

In the Second Five-Year Plan period, the part played by industry in the reconstruction of agriculture must assume special importance. If as a result of the First Five-Year Plan the agriculture of the U.S.S.R. became the largest-scale agriculture in the world, under the Second Five-Year Plan it must become the most advanced in technique as well, by reason of the exceptionally great aid it is receiving from socialist industry. During the second quinquennium industry is providing agriculture with tractors having a total capacity of 8,682,000 h.p., 78,600 harvester-combines, 170,000 motor vehicles, agricultural machines, implements and other inventory to the total value of 5,700,000,000 rubles. The production of mineral fertilizers is advancing with gigantic strides. Thus, in 1937 agriculture will receive 1,410,000 tons of nitrates (as compared with 22,200 tons in 1932), 1,680,000 tons of potash (as against 79,000 tons in 1932), 3,000,000 tons of superphosphate (614,000 tons in 1932), 2,200,000 tons of powdered phosphorite (396,000 tons in 1932).

The productive consumption of machinery and fertilizers by agriculture in the course of the Second Five-Year Plan period will in the main make possible the completion of its mechanization and will raise the technical level of agriculture to first place in the world.

Exceptionally great are the tasks which heavy industry must solve in the field of providing the necessary technical equipment and the technical basis for the development of light industry and the food industry under the Second Five-Year Plan. The quickening of the rate of development in these branches of industry, for which the First Five-Year Plan prepared the ground, is one of the central tasks of the Second Five-Year Plan. Its fulfilment must be ensured by the domestic technical and raw material resources. The extent of the production tasks assigned to the principal branches of light industry and the food industry in the Second Five-Year Plan is shown by the data given below: (See table p. 101.)

These figures testify to the vast increase in the volume of output of light industry and the food industry. They also point out the considerable rise in the consumption level of the toilers resulting from this increase. Of special significance is the decided improvement which the Plan contemplates in the assortment and

Classification of products	Units of measurement	1932	1937	1937 in % of 1932
Cotton fabrics	million metres	2,720	5,100	187.5
Woollen fabrics	„ „	94.6	226.6	250.1
Linen fabrics	million m^2	130	600	461.5
Leather footwear	million pairs	82	180	219.5
Soap (in 40 % fatty matter equivalent)	thousand tons	357	1,000	280.0
Flour and cereals (Produce Procurement Committee of the Council of People's Commissars)	„ „	8,165.5	14,000	171.5
Vegetable oils	„ „	409.7	750	183.1
Fish (catch)	„ „	1,333	1,800	135.0
Meat (P. C. of Supply)	„ „	435	1,200	275.9
Granulated sugar	„ „	828	2,500	302.0
Confectionery	„ „	548	1,350	246.3
Canned goods (exclusive of handicraft co-operative organizations)	million standard cans	716	2,000	279.3

quality of consumers' goods. Thus in the output of the textile industry, the proportion of woollens, linens and knit goods will be greatly increased, while at the same time the quality of cotton goods will be much improved and there will be a proportionate increase in the manufacture of all high-grade woven goods put out by the cotton industry. There will be a greater proportion of fats in the output of food products accompanied by a general improvement in quality.

The fulfilment by light industry and the food industry of the tasks set before them will require a vast expansion of their technical base. The radical reconstruction of the enterprises in operation and the wide development of new construction on the scale provided for in the Plan demand a great increase in the output of technically up-to-date equipment, the organization of the production of numerous new items, a determined struggle to master the new technique and the operation of the new plants with the utmost rapidity. This problem will be solved in reliance upon the internal resources of socialist industry.

II

The completion of technical reconstruction in the national economy of the U.S.S.R. during the period of the Second Five-Year Plan assures a vast growth of the means of production and a renewal of the technical equipment in all branches of national economy.

If it is taken into consideration that during the Second Five-

Year Plan period part of the equipment in operation at the beginning of the period will be withdrawn from production due to wear and tear and to the replacement of obsolete by more modern equipment, and that some of the equipment, primarily during the first years of the five-year period, will be imported, it follows that by the end of the Second Five-Year Plan period approximately 50-60 per cent of the production equipment in all branches of national economy will have been supplied during the course of the Second Five-Year Plan.

Renewal of the Production Apparatus of National Economy

Basic indices	Total equipment as of Jan. 1, 1933	Output during the Second Five-Year Plan period	Output during Second Five-Year Plan period in % of total as of Jan. 1, 1938 [1]
Metal-cutting machine-tools (in thousands)	169 [2]	129.4	43.4
Freight locomotives (in type "E" equivalents)	12,100	7,048 [3]	36.8
Freight cars (load capacity in million tons)	9.9	6.6	40.0
Motor vehicles (in thousands)	75.4	571.5	88.3
Tractors in agriculture (thousand h.p.)	2,225	8,682	80.0

[1] The total equipment as of January 1, 1938 is calculated by totalling the first and second columns of the table without taking into account depreciation and imports.

[2] Total number of machine-tools installed as of April 1, 1932.

[3] Exclusive of Diesel and electric locomotives. Inclusive of Diesel and electric locomotives, the total output for the Second Five-Year Plan period will be 7,996 units, while the renewal will constitute 39.8 per cent.

In the last year of the Second Five-Year Plan period, plants which were either built or completely reconstructed in the course of the First or Second Five-Year Plan period will already be producing about 80 per cent of the entire industrial output, as against 35 per cent in 1932. Not one capitalist country in the world has experienced such rates of renewal of the technical base of its national economy, rates which assure the introduction of the latest technical achievements in the shortest period of time.

The radical re-equipping of national economy calls for the accelerated development of new items of production. During the Second Five-Year Plan period this development assumes special importance in the manufacture of machinery, since the reconstruc-

tion processes in all branches of national economy depend on machinery production. The problems connected with the mastery of the production of new items during the Second Five-Year Plan period are characterized in particular by the fact that in individual branches of machinery production (machine-tool manufacturing, etc.), in which there was a lag during the First Five-Year Plan period in providing the respective sectors of national economy with machinery on a comprehensive scale, the number of new types of machines, the production of which is to be mastered during the Second Five-Year Plan period, greatly exceeds the number of old types produced.

The introduction of new types of technically advanced equipment and machines is accompanied in the Second Five-Year Plan period by gigantic strides in the concentration, specialization, combination and co-operation of production.

In the Second Five-Year Plan period further progress will be scored in the field of concentration of industry.

By the end of the Second Five-Year Plan period the proportion of large-scale, technically advanced units in Soviet industry will have risen to approximately 65 per cent, and in some branches to 30 per cent and over.

In the iron and steel industry of the U.S.S.R. industrial units with a capacity of more than 600,000 tons a year will supply 70 per cent of all pig iron in 1937, as against 58 per cent in 1929 in the U.S.A. In 1937 the tractor output of the U.S.S.R., equal in terms of aggregate power to 74.8 per cent of that of the U.S.A. in 1929, will be produced by four plants as against twelve main plants in the U.S.A. in 1929. In the U.S.S.R. 60 per cent of the current generated in 1937 by regional power stations will come from stations having a capacity of more than 100,000 kw. each; in Germany, in 1931, power stations of that capacity supplied only 42.7 per cent of the electricity generated by public utility power stations. In 1937, 70 per cent of all spindles in the Soviet cotton spinning industry will be concentrated in industrial units having more than 100,000 spindles each as against 64 per cent in the U.S.A. (Massachusetts) and 45 per cent in Great Britain. In the canning industry of the Soviet Union, the average capacity per plant in 1932 was already almost 3 times as great as the average capacity of canneries in the U.S.A. (20,000,000 cans as against 7,000,000 cans, etc.).

Under the Second Five-Year Plan the very type of concentra-

tion in production will change. Thus, the concentration of production will be based on a higher technical level of the production equipment, and combinations which provide the possibility of a fuller mastery of the latest technical achievements will, during the Second Five-Year Plan period, become the principal form in which the further concentration of production in a number of industries will find expression.

In the Second Five-Year Plan period the goal has been set of mastering a number of efficient new forms of combinations based on a high degree of concentration and specialization of production and on the most universal and comprehensive utilization of raw materials.

As regards machinery production, the period of the Second Five-Year Plan will see the completion of 2 combinations uniting the production of iron and steel and of machinery (Nizhni-Tagil and Nizhni-Kramatorsk), thus including both metallurgical plants and large-scale specialized machinery plants. A powerful combination of steel and iron and of transportation equipment plants is being set up in West Siberia (Stalinsk).

New forms of combinations of iron and steel manufacturing and the production of synthetic ammonia are being established by completely utilizing coke oven and blast-furnace gases. By 1937, 35.6 per cent of all synthetic ammonia will be manufactured by the low-temperature cooling process (mostly in steel and iron combinations). In the First Five-Year Plan period no ammonia at all was produced by this process. Only 7 per cent of all synthetic ammonia will be produced by the steam-oxygen process.

New forms of combinations between non-ferrous metal manufacturing and sulphuric acid production are being set up on a large scale. In 1937, 23.1 per cent of all sulphuric acid will be manufactured from the waste gases of copper smelting works as against 3.9 per cent in 1932.

In the fuel industry the production of coal, peat and oil shale is being combined with the manufacture of liquid motor fuel and a number of other chemical products (asphalt, bitumen, etc.) by applying chemical means. (In 1937 such combinations will produce about 300,000 tons of motor fuel.) The oil refineries and gas works are being combined with the manufacture of chlorine, plastic materials, etc.

In the chemical industry during the Second Five-Year Plan period new types of combinations are being organized, based upon

the complete utilization of a number of new sources of raw materials: the complete utilization of apatites and nephelines, thereby obtaining phosphorus products and aluminium oxide; the complete utilization of Solikamsk potash salts, Kara-Bugaz sodium sulphates and many other minerals.

For the food industry the Second Five-Year Plan projects a broad development of the latest meat-packing plants and fish products combinations, which ensure the most complete utilization of by-products.

Thus in the period of the Second Five-Year Plan industrial combinations are entering into a higher phase.

Soviet industry already reached a high level of mass production, specialization and co-operation, as a result of the First Five-Year Plan. Specialization and co-operation in industry are being considerably developed under the Second Five-Year Plan. In the field of machinery production, specialization and co-operation are expanding first and foremost in the manufacture of automobiles, tractors, and their parts and accessories.

In the iron and steel industry the Second Five-Year Plan period will register considerable progress in specialization, above all in the output of rolled products. In this period the vast majority of new plants is being provided with highly specialized rolling mills (*e.g.*, the Krivoy Rog Works with a rolling shop for merchant, medium and small sizes; the Azov Steel Plant with a rail and beam rolling mill; the Zaporozhye Steel Plant with a sheet rolling mill, etc.), but the specialization of rolling mills will also be intensified at the old plants. Along with this the number of different shapes rolled by any one machine is being limited, while simultaneously the production of new shapes is being developed.

In the textile industry further specialization is characterized by a decrease in the assortment of fabrics, unbleached cloth, or yarns turned out by any one finishing, weaving or spinning mill. Thus, in the cotton industry the number of grades of yarn turned out by any one spinning mill is being reduced from an average of 5.5 in 1932 to 4 in 1937, and the average number of different grades of unbleached cloth at any one textile mill—from 3.2 to 2.1, the average assortment of fabrics at any one finishing mill—from 10.3 to 7.0.

The most striking expression of the completion of the technical reconstruction of national economy is the fact that throughout the period of the Second Five-Year Plan the extended reproduction of

the means of production in all branches of national economy will be accomplished by the forces of Soviet heavy industry, with machinery production in the leading role. Approximate calculations show that the machinery output for the last year of the Second Five-Year Plan period will be equal to approximately 15-17 per cent of the total amount of machinery in national economy as a whole. This means that the domestic production of the U.S.S.R. will fully ensure not only the replacement but also the further rapid increase in the number of its machines.

Thus, the development of heavy industry definitely assures the Soviet Union of "economic independence which will safeguard the U.S.S.R. against being converted into an appendage of capitalist world economy" and provides a basis for the rise of output during the succeeding Five-Year Plan period at a rate unheard of in history.

Under the conditions of socialism prevailing in the Soviet Union, the amount of machinery provided for by the Plan opens up vast possibilities for the replacement of hand labour by machines and for the development of the use of machinery in all branches of national economy. In a socialist State, said Lenin, "we cannot condemn people to hard labour. More machines must be introduced everywhere. Machine technique must be adopted on a much vaster scale."

The Second Five-Year Plan will accomplish, in the main, the task set by Lenin and concretized in the decisions of the Government and Communist Party of mechanizing on a vast scale the heavy, laborious processes in the timber, building, coal-mining, peat and iron and steel industries; it will also accomplish the task of developing the all-sided mechanization of industry as a whole.

As a result of the First Five-Year Plan a number of branches of industry in which hand labour had predominated theretofore shifted to the use of individual machines and to a large extent even installed a system of machinery.

In the Second Five-Year Plan period the industry of the U.S.S.R. enters a new stage of mechanization. The reconstruction of all branches of industry is being completed on the basis of large-scale machine production. In a number of branches, trades involving heavy hand labour are being almost entirely eliminated, while automatic machinery is being introduced in all branches of industry. This new stage of mechanization lays the foundation for a new upsurge in labour productivity, in so far as the advantages

of machine production can only be reaped in full when the system of machinery will have been completely introduced and the operation of this system of machinery will have been made automatic.

The mechanization of the principal processes of timber production was begun during the First Five-Year Plan period. In 1932 logging was 1.0 per cent mechanized, stripping 20 per cent, hauling—4.4 per cent.

During the Second Five-Year Plan period all the main processes in the mechanization of timber production are exhibiting considerable progress. In 1937 the mechanization of logging for enterprises under the People's Commissariat of Timber will constitute 16.4 per cent, of stripping—62.7 per cent, of hauling—28.3 per cent. Timber hauling by mechanized and rationalized methods will increase to 62.9 per cent as compared with 21.3 per cent in 1932.

Earth work in building operations was 15 per cent mechanized in 1932 by the use of excavators; rock crushing—50 per cent; transportation (horizontal) on the job—30 per cent, stone quarrying—45 per cent. As a result of the First Five-Year Plan period construction—a branch of industry in which hand labour formerly predominated—has in the main changed to machine technique. However, at the beginning of the Second Five-Year Plan period individual links were still missing in the chain of completely mechanized labour processes, and in several instances only individual machines were installed.

Under the Second Five-Year Plan with its great increase in the amount of available construction machinery, the mechanization of all the main processes in construction will attain 80 per cent or more.

Mechanization of Construction Processes in 1937
(percentages)

Earth work:			
Excavators	50	Delivery of concrete from mixers	24
Hydro-mechanical	20		
Concrete mixing	95	Sorting of aggregates	90
Transportation on the job (horizontal)	80	Stone quarrying (pneumatic)	90

Construction is being transformed into a branch of industry which, in degree of development of mechanization, ranks with the advanced branches.

In the coal-mining industry, at the beginning of the First Five-Year Plan period mechanization was limited to the use of hoists,

ventilators and pumps while the basic processes were performed by heavy hand labour. As a result of the First Five-Year Plan, cutting and gathering have been largely mechanized (65.4 per cent and 76.5 per cent respectively). A start was made in the mechanization of hauling (15 per cent) and surface work (26 per cent).

In the period of the Second Five-Year Plan the process of loading coal will begin to be mechanized (20 per cent). The mechanization of hauling (80 per cent) and of surface work (60 per cent) as well as the mechanization of cutting and of gathering (93 and 90 per cent respectively) will be further developed. At the same time the task has been set of improving existing machines, (equipping cutting machines with automatic feed, adapting pneumatic pick hammers to electric power, etc.) and the introduction of the most perfected forms of mechanization (widespread development of electric haulage, gathering by scrapers and conveyors, etc.). A whole series of new machines is being introduced on the basis of which the mechanization of coal mining is being completed.

In the peat industry in the period of the First Five-Year Plan the correlation between the extraction process based entirely on hand labour (cutting process), that based on the use of individual machines (moulding machine process), and those methods of extraction which make possible the installation of a system of machinery (hydro-peat, milling process, dredging process) radically changed. The proportion of the latter rose to 49.7 per cent in 1932 (in the All-Union Peat Association—to 76.2 per cent). However, here too, some of the principal processes (rolling, gathering, stacking, preparation of the bog) were still very poorly mechanized, and in some respects not mechanized at all.

In the Second Five-Year Plan period the proportion of mechanized extraction in the peat industry will be raised to 71.7 per cent. Simultaneously the moulding-machine method will be perfected. There will be large-scale mechanization of preparatory work (80 per cent in 1937) and of processes poorly mechanized at the beginning of the Second Five-Year Plan period, *e.g.*, removal and drying (65 per cent in 1937). The completion of mechanization in the peat industry is being effected through the introduction of perfected machinery of Soviet make, such as combines, etc.

In the blast furnace departments of the iron and steel industry at the start of the Second Five-Year Plan period, 25.5 per cent of

all pig iron was already obtained from completely mechanized furnaces.

In coal mining under the Second Five-Year Plan the completion of the laborious processes in the blast furnace departments of the iron and steel industry will be brought to completion; in 1937, 80 per cent of the pig iron will be produced by completely mechanized blast furnaces. In the remaining blast furnace departments partial mechanization will be extensively applied. The elimination of hand labour in the principal processes is here being accomplished by the introduction of perfected automatic machinery (automatic car scales, automatic skip hoists, etc.).

By thus completing the shift to a system of machinery in the backward branches of industry, the U.S.S.R. is outstripping the most advanced capitalist countries, inasmuch as the mechanization of the industries exacting heavy physical labour is proceeding very slowly under capitalism. In the period of the Second Five-Year Plan the U.S.S.R. will attain first place in the world as regards the mechanization of coal mining, peat extraction and timber production.

At the same time under the Second Five-Year Plan the use of automatic machinery will be developed and hand labour will be further eliminated in industries that had adopted a system of machinery before the First Five-Year Plan.

In the machinery producing industry the proportion of modern automatic metal-cutting machine-tools was increased considerably even in the First Five-Year Plan period. Under the Second Five-Year Plan the U.S.S.R. will attain first place in the world as regards the level of development of machine equipment and its automatic character in certain branches of machinery production (the manufacture of agricultural machinery and some processes of the automobile industry). In the iron and steel industry of the U.S.S.R. the further introduction of automatic machinery is characterized by the fact that in 1937 more than 50 per cent of rolled products is scheduled to be supplied by completely automatic finishing rolling mills. In the cotton industry under the Second Five-Year Plan the percentage of wholly automatic looms will rise from 10.6 per cent to 40 per cent. In the hemp industry the proportion of the output turned out by automatic spinning will rise from 54.1 per cent to 100 per cent. In the match industry the percentage of output produced by automatic machinery will grow from 80 per cent to 100 per cent, etc.

Thus, with the substitution of machinery for hand labour, the technical base of industry as a whole is entering a qualitatively new phase of development. This likewise results from the completion of the reconstruction of the electric power base of national economy.

Under the Second Five-Year Plan the generation of electric current is being concentrated for the most part in powerful stations which are being provided with the latest equipment. High steam pressure, high steam superheat, water-wall boilers, automatic control, the most modern methods of fuel consumption, etc., are being applied on a large scale. The biggest electric grids in the world are being created, the linking up of regional stations into interconnecting regional systems is being completed and the linking of stations into inter-regional superpower systems is being begun. The U.S.S.R. is likewise outdistancing the most advanced capitalist countries in the field of heat-and-power development.

Under the Second Five-Year Plan the electrification of industry will be completed. By the end of that period, the U.S.S.R. will be ahead of Europe and on a par with the United States as regards the coefficient of electrification of industry, and will surpass the most advanced European countries as regards the electric power supply per worker in industry.

Indices of power equipment	U.S.S.R.		U.S.A.[1]	Germany[2]
	1932	1937	1929	1930
Coefficient of electrification in industry (based on electricity consumption) . . .	69.2	86.0	86.4	—
Electric power supply per worker (in kwh.).	2,100	4,670	6,540	2,910
General power supply per worker (in kwh.).	3,030	5,300	7,573	—

[1] Manufacturing industries. Calculated from data of the industrial census for 1929.

[2] Calculated according to *Wirtschaft und Statistik*, "Industrielle Produktion," Special Issue No. 10, 1933.

The electric power supply available per worker in industry in the U.S.S.R. in 1937 will amount to about 71 per cent of the electric power supply available per worker in the U.S.A., and will be more than one and a half times (160 per cent) as great as the electric power supply per worker in industry in Germany.

Simultaneously with the universal electrification of the industrial power supply a tremendous development in the application of electric power to the spheres of electric heat processes and

electro-chemistry will take place. In 1937, 24 per cent of all electric power consumed by the industries of the four industrial People's Commissariats will be used to meet technological requirements.

Under the Second Five-Year Plan electricity is gradually being introduced in agriculture. The consumption of electricity in agriculture for production requirements will increase 10 to 15-fold. Under the Second Five-Year Plan electrification will likewise become an effective means of reconstructing the most congested sections of the railroad trunk lines.

The completion of the reconstruction of the electric power supply of national economy as a whole finds its most striking expression in the fact that the U.S.S.R. by the end of the Second Five-Year Plan period will come close to the formation of a unified high voltage network in the European part of the U.S.S.R.

In the completion of the technical reconstruction of national economy, a prominent part is played by the application of chemistry which is "one of the main factors in the development of the productive forces of national economy and a source of new accessions to material culture."

The use of chemistry in national economy gives wider scope to the formation of industrial combinations based on the comprehensive utilization of raw materials and waste products, the creation of new sources of raw material and the speeding up of technological processes.

In the iron and steel industry under the Second Five-Year Plan the further application of chemistry will be marked by the comprehensive utilization of both blast furnace and coke gases, and on this basis the manufacture of iron and steel will be combined with that of synthetic ammonia. In the non-ferrous metals industry, the large-scale introduction of chemical methods of flotation under the Second Five-Year Plan will transform the technique of copper extraction, ensuring the complete utilization of waste products, of the roasting gases of non-ferrous smelters and of the flotation tailings. This will also create new chemical raw materials and will give rise to new ways of combining the non-ferrous metals industry and the chemical industry. In the fuel industry under the Second Five-Year Plan new ways of manufacturing liquid motor fuel and new chemical products will be put in use through the application of chemistry. The distillation of coal, peat and oil shale will be developed. Chemical treatment of waste products is projected for

the timber industry. This will yield plastic materials, carbohydrates, alcohol and a number of other chemical products.

Under the Second Five-Year Plan the application of chemistry takes on tremendous importance in agriculture, especially in relation to the central task set by the Communist Party: increase of yield. The extensive development of the chemical industry ensures the widespread use of fertilizers and of chemical means for fighting agricultural pests. The amount of ammonium sulphate supplied to agriculture is multiplying 64 times, that of sylvinite—21 times, of powdered phosphate—5.6 times, of superphosphate—4.9 times.

With the absolute completion of collectivization the technical level of agriculture is being radically transformed. Under the Second Five-Year Plan the agriculture of the U.S.S.R. is completing the shift to a system of machinery, rising to the plane of large-scale mechanized industry. Agricultural labour is being transformed into a variety of industrial labour. At the same time the entire technique of agriculture of the U.S.S.R. is surpassing in quality that of agriculture in the most advanced capitalist countries. Under the Second Five-Year Plan the main production processes in agriculture will be mechanized to the following extent: preparing the land for seeding—80 per cent; grain harvesting—60 per cent (in the main grain-growing districts—75-80 per cent); cultivation of fallow land and planting of row crops—70 per cent.

Soil amelioration and irrigation are developing at a rapid pace under the Second Five-Year Plan. The irrigated area is being augmented by 1,000,000 ha. Much preparatory work is being done for the irrigation of the Trans-Volga Area.

The completion of technical reconstruction in transportation will likewise mean its thorough reorganization into a branch of large-scale machine industry. The main processes in railroad transportation are being made automatic on a scale more extensive than prevails in most advanced capitalist countries (equipment of all freight cars with automatic brakes, 50 per cent with automatic couplings and about 9 per cent of the entire railroad trackage with automatic block signals). Electrification of railroad transportation is being developed and the use of electricity in waterway transportation will begin. The mechanization of auxiliary processes is proceeding intensively. (The mechanized handling of freight shipments on the railroads is increasing from 18 per cent to 57 per cent.) A change in railroad transportation to powerful equipment

is being effected on a broad scale by the introduction of the powerful "FD" locomotive and of dumping cars of great load capacity; in waterway transportation, by the use of higher-powered tug boats; in motor haulage, by the use of trucks of greater load capacity.

While railroad transportation plays the chief role in the total freight turnover of the country; under the Second Five-Year Plan the proportion of river transportation and truck hauling will be increased. During this period the U.S.S.R. will make great strides in motorizing the country. The proportion which motor haulage forms of the total automotive and horse-drawn transportation is rising to 50-55 per cent. The mechanization of intra-factory transportation is being considerably increased.

The completion of technical reconstruction in national economy during the Second Five-Year Plan period is giving rise to a unified transportation system in national economy as a whole.

Decisive changes in the geographic distribution of the productive forces are an integral part of the completion of technical reconstruction during the Second Five-Year Plan period.

The new iron and steel works of the Urals and of Siberia, the new coal mines of the Kuzbas, the new textile combinations of the republics of Central Asia, etc., are radically changing the face of these districts and are there creating an industry which is technically not only not inferior but in many respects superior to that of the old districts. The completion of technical reconstruction in national economy thus finds expression in the abolition of the disparity in technical level not only between the various branches of industry but also between the various districts. No less significant from the point of view of changing the geographic distribution of productive forces and the further all-sided economic development of the various districts of the Soviet Union is the transformation of agricultural labour into a variety of industrial labour. The mechanization of agriculture is the basis on which the dearth of traction facilities prevailing in certain agricultural districts is being overcome. The extension of the sowing area and the growth of the technical equipment of agriculture in the consumers' zones will bring about the complete discarding of the division of areas into producers' and consumers' districts. At the same time there are created the prerequisites for the abolition of the contrast between industry and agriculture as well as for the accelerated development of both agriculture and industry.

The solution of all these problems ensures the more even geographic distribution of the forces of production, the placement of industry nearer to the sources of raw material, the specialization of the principal districts according to crops, and gives rise to such a configuration in the territorial distribution of the productive forces as will involve the abolition of the economic and cultural backwardness of the national republics and districts.

The radical re-equipment of the national economy of the U.S.S.R. during the completion of its technical reconstruction and the creation in the U.S.S.R. of such a technical base for national economy as in many respects surpasses the technical base of the most advanced capitalist countries hinge not only on the critical assimilation of the technical achievements of the foremost capitalist countries but to a considerable extent on the independent paths of development pursued by socialist technique as well.

In coal mining under the Second Five-Year Plan the completion of the mechanization of the most important production processes will be largely accomplished through the installation of Soviet-designed machinery (mining combines, loading machinery, etc.).

In the oil industry extensive use is being made of Soviet-designed automatic drilling machines and of the Kapelushnikov turbine drill, a Soviet invention of great importance in the transformation of drilling.

In the peat industry, even under the First Five-Year Plan, mechanization was largely accomplished by machinery and methods devised for the first time in the U.S.S.R. During the Second Five-Year Plan period the percentage of milled peat and hydropeat (methods worked out exclusively in the U.S.S.R.) will increase. Soviet technique, by pursuing independent paths, will make great progress in overcoming the seasonal character of work in the peat industry.

New independent methods are being extensively applied to solve the problem of using low grades of fuel (the burning of peat, etc.) in the field of electrification. Boilers of original design are being manufactured.

Electric carding machines designed in the U.S.S.R. are being introduced in the textile industry during the Second Five-Year Plan period. The basic principle of these machines will also find application in a number of other production processes. In the linen industry the reconstruction of spinning will largely be based on the introduction of the Zvorykin water frame, which greatly increases spinning speed and in the woollen (cloth) industry—on the intro-

duction of the Khrushchov ring spindle. (The proportion will increase from 0 to 30 per cent of the number of spindles used in the manufacture of woollens.)

In agriculture a decisive role will be played by the independent line of development taken by socialist technique in bringing about the projected mechanization of the harvesting and processing of a number of industrial crops.

In the field of transportation, Soviet technicians are solving the problem of automatic brakes, also the problems of new locomotive, ship and aeroplane construction, etc.

In all these directions tremendous construction tasks as well as the mastery of entirely new items of production confront the machinery industry, which must make certain that the requirements of re-equipping national economy are met by supplying machines of original design.

Even under the First Five-Year Plan Soviet technique solved independently a number of problems relating to the reconstruction of national economy. However new machines, new production methods, have only begun to penetrate the industries. The characteristic feature of the Second Five-Year Plan consists in the fact that this independent development of socialist technique is being realized in practice on a broad scale.

III

"The training of skilled workers, technicians and engineers, the solution of the problem of creating a proletarian technical intelligentsia," point out the decisions of the Seventeenth Congress of the Communist Party, "constitutes a decisive condition for the realization of technical reconstruction, of the mastery of technique and the fulfilment of the tasks assigned with regard to labour productivity."

Mastery of the up-to-date technical equipment being installed as a result of the completion of technical reconstruction in all branches of national economy under the Second Five-Year Plan is inseparably connected with the complete establishment of socialist labour discipline—by overcoming the capitalist survivals both in economic life and people's minds. It is also related to the achievement of the task of creating a distinct proletarian technical intelligentsia and to the establishment of universal compulsory polytechnic education in town and country.

The solution of the problem of technical cadres and the im-

provement in the qualification of the workers, the struggle for qualified technical leadership and, first and foremost, for the best organization of labour, also provide means for achieving the task of mastering the new technique and utilizing the new enterprises.

Under the Second Five-Year Plan the national economy of the U.S.S.R. is faced with two kinds of tasks.

The first is the creation of reserve production capacities of considerable dimensions in all branches of national economy. Under the Plan, the achievement of this task takes the form, for example, of providing production equipment in the main branches of manufacturing with a reserve capacity which amounts to from 20 to 30 per cent of the total capacity.

Second, along with this, the task has been set of increasing the utilization of the capacity of production equipment in all branches of national economy, which represents a very important section of the plan of mastering the new technique.

The improved utilization of the production equipment under the Second Five-Year Plan will mean that the rate of growth of industrial output for several branches of industry will surpass the rate of growth of the technical capacity of the plant equipment.[1] Thus, in the iron and steel industry, the capacity of pig iron production will grow 2.1-fold, while output will be raised 2.6-fold; in the non-ferrous metals industry the capacity of production equipment will multiply 2.2 times, but production—2.9 times. The capacity of plants engaged in primary oil refining will multiply 1.7 times, production—1.85 times. The capacity of the automotive industry will grow 3.9-fold, output—8.4-fold; the capacity of agricultural machinery production will multiply 1.2 times, output—1.8 times. In cement manufacturing the capacity will be raised 1.7 times, output—2.2 times. In the cotton industry the capacity will be raised 1.5 times while output will increase 1.9 times. In the woollen industry capacity will multiply 2.1 times while output will be raised 2.4 times.

However, progress in the mastery of technique is expressed not only by the fact that the rate of increase of output exceeds the rate of increase of capacity, but the growth of the capacities themselves is to a certain extent based on increased utilization of equipment. The rise in the percentage of the most modern equipment, the re-

[1] The capacity of the new works and machine units is calculated as set forth in the projects; in determining the capacity of old works, the optimum production conditions are used by the State Planning Commission as a basis; for purposes of comparison the average annual capacity for the last years respectively of the First and Second Five-Year Plan periods were taken.

construction of plants with a view to giving the widest scope to the most modern methods of controlling production processes, the creation of stable bases for agricultural raw materials which provide a considerable improvement in overcoming seasonal fluctuations still existing in certain branches of industry, the increase in the number of shifts and the improvement in the organization of labour are all factors which render it possible to make higher technical indices for equipment operation the basis of output capacity. For this reason as well the capacity of the production equipment will be raised considerably.

Thus, the annual use factor of regional power stations is increasing from 3,460 hours in 1932 to 4,200 hours in 1937. In the iron and steel industry the Plan provides for an improvement in the coefficient of volumetric efficiency of blast furnaces which is to drop from 1.75 in 1932 to 1.20 in 1937, and for the new furnaces to 1.00. In the oil industry the drilling depth per drilling machine is being increased from 108.3 metres per month to 300 metres; in the production of lumber the output per frame per shift increases from 22.4 cubic metres to 29.9 cubic metres, and so forth. Concomitantly with this the number of work days per annum is sharply rising in a number of branches of the food industry (sugar, canning, etc.), in the building materials industry, the building industry and the peat industry where hitherto seasonal work has been lowering the production possibilities of the various enterprises.

No less progress will take place under the Second Five-Year Plan as regards the utilization of equipment in agriculture. This may be seen from the following data:

Under the Second Five-Year Plan the total power of the available tractors will increase 3.7 times, while at the same time the amount of land prepared for seeding by tractor-drawn equipment will increase 4.4 times. In other words, the intensified utilization of the available tractor fleet makes it possible to mechanize the ploughing of an additional 18,000,000 hectares of soil. The capacity of the total number of harvester-combines will grow 6.7-fold in the period of the Second Five-Year Plan, during which time the harvesting of grain by means of harvester-combines will increase 7.9 times. This means that the intensified utilization of the available harvester-combines will make it possible to mechanize the harvesting of grain on an additional 4,700,000 hectares of soil.

The increasing mastery of the new technical equipment in the Second Five-Year Plan period also finds striking expression in the projected qualitative indices.

The superiority of the socialist order becomes manifest in the fact that while developing the reconstruction of the technical equipment on a very broad scale, socialism at the same time ensures rates of growth of labour productivity and decreased production costs unattainable by capitalism.

The greatest increase in labour productivity and lowering of the cost of production has been planned precisely in those branches where the greatest technical reconstruction has been proceeding during both Five-Year Plan periods. This applies to those branches of industry which were especially behind in their qualitative indices during the First Five-Year Plan period (coal mining, iron and steel production), as well as to the branches of machinery production which in their qualitative indices were approximately even with the Plan, and in which during the Second Five-Year Plan period the mastery of new manufactures is developing. During the Second Five-Year Plan period about 64.5 per cent of the economies to be realized in the coal, iron and steel and the machinery industries are to be effected through lowering production costs in the industries under the People's Commissariat of Heavy Industry. The rise in labour productivity in these branches of industry is plotted at a higher rate than for industry as a whole: in iron and steel the rate is 100 per cent, in coal mining—91 per cent, in machinery construction—85 per cent, and in large-scale industry as a whole—63 per cent.

Under the Second Five-Year Plan the manifold utilization of the superiority of the new technical equipment will likewise find expression in the more rapid growth of labour productivity in the new plants and machine units as compared with the old ones. Whereas labour productivity in machinery construction (within the scope of comparison) will rise 85 per cent, a more than 2 to 2.5-fold increase is planned for the most important new enterprises. While labour productivity in the iron and steel industry will increase by 100 per cent on the average, the contemplated rate for the new units is 216 per cent, and for the old ones—72 per cent.

It is also a characteristic feature that in the iron and steel industry the highest rate of increase in labour productivity is planned for the blast-furnace departments, where laborious processes are being mechanized on a mass scale. The rise in labour productivity in the blast-furnace departments is scheduled at 178.4 per cent; it is to be 162.6 per cent in the open-hearth departments and 146.7 per cent in the rolling mills.

Mastery of new production processes, more rational utilization of new and old equipment, introduction of preliminary treatment of raw material and reinforcement of cost accounting in the Second Five-Year Plan period assure a considerable reduction in consumption rates for raw and auxiliary materials including fuel. Fuel consumption rates throughout all industry will be reduced 17 per cent; coke consumption per ton of pig iron will be reduced by 18 per cent; fuel per ton of steel in the open-hearth departments will be reduced by 25 per cent.

The rate of metal consumption in machinery production will be reduced by 20 per cent.

The copper yield from ore extracted in water jackets will be raised 13.7 per cent, in reverberatory furnaces—35.7 per cent, etc.

The sugar yield obtained from sugar beet will be raised 7 per cent.

The particular significance of the projected saving in consumption of raw and auxiliary materials including fuel lies in the fact that on it depends one third of the total decrease in the cost of industrial production during the period of the Second Five-Year Plan.

Thus the completion of the technical reconstruction of national economy in the Second Five-Year Plan period finds expression in the immense scale on which the production apparatus is being enlarged and renewed, in the shift effected in every branch of national economy to the technique of modern, large-scale machine industry, in the rise of the cultural and technical level and the degree of skill of the working class and collective farmers, in the all-sided mastery of this new technique.

IV

The gigantic growth of the forces of production during the Second Five-Year Plan period will have the effect of raising the capacity of the production apparatus of Soviet national economy by the end of that period above that of the foremost European capitalist countries. On this basis the Soviet Union is outstripping the advanced capitalist countries in level of physical output of national economy as a whole, while at the same time it is capturing first place in volume of output for individual branches of agriculture, even if compared with the volume of output attained by the capitalist countries in 1929, their production peak. This appears from the following data:

Names of industries	Capitalist countries (at their 1929 level) outstripped by the U.S.S.R. in absolute volume of output		Capitalist countries (at their 1929 level) in the lead of the U.S.S.R. after the Second Five-Year Plan period
	During the First Five-Year Plan period (1932)	During the Second Five-Year Plan period (1937)	
Electricity	Switzerland, Norway, Italy, Japan	Gt. Britain, France, Japan, Canada, Germany	U.S.A.
Coal	Poland, France	...	U.S.A., Gt. Britain, Germany
Oil	Venezuela	...	U.S.A.
Peat	U.S.S.R. leads all countries	...	U.S.S.R. leads all countries
Pig iron	Belgium	Gt. Britain, France, Germany	U.S.A.
Steel	Belgium	Gt. Britain, France, Germany	U.S.A.
Electric steel[1]	Sweden, Gt. Britain	Italy, France, Germany	U.S.A.
Rolled products	Belgium	France, Gt. Britain, Germany	U.S.A.
Machinery production as a whole	Germany, Gt. Britain, France	...	U.S.A.
Trucks	Switzerland, Belgium, Austria, Czechoslovakia	Germany, Canada, Gt. Britain, France	U.S.A.
Harvester-combines	...	...	U.S.A.
Chemical Industry:			
Ammonium Sulphate	Austria, Canada, Spain	Czechoslovakia, Holland, Poland, Italy, France, Japan, Belgium, Gt. Britain, U.S.A.	Germany
Sulphuric acid	Poland, Spain, Portugal	Belgium, Italy, France, Gt. Britain, Germany	U.S.A.
Superphosphate	Portugal, Poland, Belgium, Gt. Britain	Holland, Germany, Italy, Spain, Japan, Australia, France	U.S.A.
Leather footwear	France	Gt. Britain, Germany	U.S.A.
Wheat[1]	USSR leads all countries except U.S.A.	...	U.S.S.R. leads all countries
Sugar beet[1]	USSR leads all countries except Germany	...	U.S.S.R. leads all countries

[1] Compared with the 1928 output of the capitalist countries.

The completion of the technical reconstruction of national economy introduces new features in the dynamics—essentially antithetical under capitalism and under socialism—of the main divisions of social production.

The average annual rates of increase in the physical output of the principle divisions of social production are as follows:

Principal divisions of social production	U.S.S.R. during the Second Five-Year Plan period (1933-37)	U.S.A. during the years of "prosperity" (1924-29)[1]
I. Industry	16.5	4.8
1. Means of production	14.5	5.1
2. Articles of consumption	18.5	2.7
II. Agriculture	14.9	1.7[2]

[1] According to the data of the National Bureau of Economic Research.
[2] 1925-29.

The data quoted show that in the U.S.S.R. the production of means of production as well as of articles of consumption is increasing at rates unheard of in capitalist countries.

Under the Second Five-Year Plan the new features in the contrast between the dynamics of the basic divisions of social production in the U.S.S.R. and those in the advanced capitalist countries, directly connected with the completion of the technical reconstruction of the entire national economy of the U.S.S.R., are as follows: 1) Light industry and the food industry will develop at an even faster pace than heavy industry. The completion of technical reconstruction in light industry and the food industry, and the rapid growth in the volume of their output testify to the all-inclusive character of socialist industrialization. 2) As a result of the victory of the socialist forms in agriculture, under the Second Five-Year Plan the rates of agricultural development will already approximate those of industrial development during the process of completing technical reconstruction and of switching agriculture to the track of large-scale machine industry.

Labour productivity is the decisive factor in the struggle between the two systems, for "capitalism can be vanquished and will be vanquished by the fact that socialism will create a new, a much higher labour productivity." (Lenin.)

The Second Five-Year Plan proposes a considerable rise in the rate of increase of labour productivity. This becomes apparent by comparing the rate of 41 per cent under the First Five-Year

Plan with the 63 per cent increase provided for in the Second Five-Year Plan, a rate one and a half times as high. The average annual rate of increase in labour productivity during the Second Five-Year Plan period will be above 10 per cent as compared with 8.4 per cent during the First Five-Year Plan period and 4.5 per cent a year in the manufacturing industry of the U.S.A. between 1920 and 1931; *i.e.*, it will be twice as high as that of the U.S.A. in the post-war period. From 1899 to 1929, *i.e.*, in 30 years, the American manufacturing industry could register an increase in labour productivity of only 57 per cent, or less than the U.S.S.R. is achieving in the period of the Second Five-Year Plan alone. In agriculture labour productivity will grow by 87 per cent under the Second Five-Year Plan.

The new feature in the field of labour productivity under the Second Five-Year Plan consists in the fact that on the basis of the completion of the technical reconstruction of national economy and the enhanced mastery of technique not only are unprecedented rates of increase in labour productivity assured, but as regards the level of labour productivity in a number of highly important branches of industry the U.S.S.R. is beginning to surpass the advanced capitalist countries of Europe.

Thus, by the end of the Second Five-Year Plan period, as regards labour productivity in the coal industry, the U.S.S.R. will surpass the 1929 level of France, Great Britain and Germany, and in the smelting of pig iron it will outdistance Germany, which ranks second in the world in this respect. (See table p. 123.).

If it is considered that in the U.S.S.R. the working day is shorter than in any capitalist country, the difference in the level of labour productivity for pig iron manufacturing between the U.S.S.R. and the U.S.A. will be diminished considerably, and in the coal-mining industry the U.S.S.R. will leave all countries of Europe far behind.

As far as may be judged from price indices, the Second Five-Year Plan also makes certain that the level of the advanced capitalist countries of Europe will be surpassed as regards labour productivity in individual branches of light industry and the food industry.

However, the superiority of socialist production makes it possible to attain a higher level of social labour productivity and of mastery of the most modern technical equipment of national economy as a whole than the data on labour productivity in in-

LABOUR PRODUCTIVITY IN THE U.S.S.R. AND IN CAPITALIST COUNTRIES

1. *Pig iron smelting per worker per annum (in tons)*[1]

U.S.S.R.	1932	255
	1937	710
Germany	1929	611.9
U.S.A.	1929	1,734.6

2. *Coal output per worker per shift (in kilograms)*[2]

U.S.S.R.	1932	697
	1937	1,302
Germany (Ruhr)	1929	1,271
Great Britain	1929	1,102
France	1929	694

[1] The figures for the U.S.A. are from the data of the industrial censuses, the figures for Germany are from the *Statistisches Jahrbuch für die Eisen- und Stahlindustrie.*

[2] For the capitalist countries the data are taken from *Die Wettbewerbslage der Steinkohle,* 1933.

dustry and other branches of national economy taken separately would indicate.

If under capitalism the rise in labour productivity and the improvement in the organization of work within the factories are based on constantly increasing exploitation of the workers and are accompanied by an increased waste of labour within society as a whole, in the U.S.S.R. the superiority of the socialist mode of production and the development of labour productivity on the basis of consolidating the socialist production relationships and national economic planning are attended by the rapid growth of the mastery of technique and the all-sided utilization of the productive forces both in the individual plants and in national economy as a whole.

Under capitalism the waste of labour in production is particularly well illustrated by the small extent to which equipment is utilized. In the U.S.S.R. under the Second Five-Year Plan the indices of utilization of equipment will be much higher in many key branches of industry than in the most advanced capitalist countries.

Thus in the coal-mining industry the annual utilization of cutting machines in 1937 will be 1.7 times as great as in Germany (Ruhr), 2.5 times as great as in the United States and 3.4 times as great as in Great Britain in 1929. In 1937 the utilization of the capacity of the regional electric power stations in the U.S.S.R. will

be 37 per cent greater than in the U.S.A., and 92 per cent greater than in Germany in 1929.

In the field of transportation the utilization of the railroad network (freight traffic per kilometre of trackage) in the U.S.S.R. in 1937 will be 107 per cent above the U.S.A., 142 per cent above Germany, 231 per cent above France and 274 per cent above Great Britain in 1928. Utilization of freight cars (the average daily run of freight cars) in the Soviet Union in 1937 will be 2.8 times as great as that in the U.S.A., 3.6 times as great as in Germany and 8 times as great as that in Great Britain.

The superiority of the U.S.S.R. in the utilization of machinery in agriculture will be especially significant. Thus, in 1937 the utilization of tractors (operating hours per annum per tractor) in the U.S.S.R. will be 6 times as great as in the U.S.A.

Thus, in the period of the Second Five-Year Plan not only will the U.S.S.R. attain first place in Europe as regards technique; it will also surpass the most advanced capitalist countries as regards the utilization of this technical equipment in a number of fields.

* * *

The completion of technical reconstruction is radically changing the face of the Soviet Union.

Pre-revolutionary Russia ranked first in the world in the size of its territory and third (after China and India) in size of population. With reference to explored natural resources it was behind the advanced capitalist countries; in volume of industrial production it occupied fifth place in the world. Russia was equipped with modern means of production to an extent of "one-fourth that of Great Britain, one-fifth that of Germany and one-tenth that of America" (Lenin) and in labour productivity it lagged far behind the advanced capitalist countries.

By the end of the Second Five-Year Plan period, the U.S.S.R., while retaining the same rank with respect to territory and population, will have attained first place in the world as regards the explored deposits of some of the natural resources (iron ore, oil, potash, etc.). As regards the total amount of explored natural resources it will hold one of the foremost places in the world. In volume of industrial output it will rank second in the world when compared with the output of the capitalist countries at their 1929 level. It will be better equipped with modern means of production than the advanced European countries, yielding first place only to

the U.S.A., and with reference to labour productivity it will overtake the advanced capitalist countries in several of the most important branches of industry.

The new element in the struggle between the two systems—capitalism and socialism—during the period of the Second Five-Year Plan is that the U.S.S.R. will not only surpass the most advanced capitalist countries in rate of increase of volume of output and in rate of increase of labour productivity, as it did during the First Five-Year Plan period, but will also outstrip the foremost countries of Europe in absolute volume of output, in the capacity of its production equipment and in the level of the technical base of its national economy, while it is beginning to surpass them in the level of labour productivity.

In the capitalist countries the constantly intensifying general crisis of the capitalist system as a whole is best proof of the approaching collapse of the capitalist world. In the U.S.S.R. the proletariat is registering new successes under the Second Five-Year Plan, for it "is realizing a higher type of social organization of labour than prevails under capitalism. Herein lies the crux of the matter. Herein lies the source of the strength and the guarantee of the inevitable complete victory of Communism." (Lenin.)

INDUSTRY

MACHINERY PRODUCTION

UNDER the Second Five-Year Plan the machinery industry, the leading branch of the national economy of the Soviet Union, must ensure that all modern technical equipment requirements of national economy will be satisfied. This industry's production program for the Second Five-Year Plan period is accordingly based upon the following fundamental propositions:

1. There must be a marked rise in the supply of machinery to national economy, a rise considerably in excess of the rate of increase of construction. While the latter is to rise 73.6 per cent by 1937 as compared with 1932, Soviet-made equipment supplying the needs of construction is to increase 150 per cent.

Special attention is to be paid to improving the technical state of transportation (rolling stock and equipment), of agriculture, light industry, the food industry and the leading branches of heavy industry, especially the development of machine-tool manufacturing.

2. Particular stress must be laid on forcing the speed of production of those machines, tools, etc., which had to be imported during the First Five-Year Plan period; also of the most important items of technical supply (parts, semi-finished products, etc.).

3. A sufficient stock of spare parts must be guaranteed to meet the operating requirements of the rapidly growing equipment in every branch of national economy (locomotives and railroad cars, motor vehicles, tractors and agricultural machinery, industrial equipment, etc.).

4. The mass production of metal products for general consumption must be developed.

5. The Soviet Union's defensive strength must be reinforced, the mechanization and motorization of the army intensified, aviation must be further developed and the Red Army and Navy provided with every modern means of defence.

The Second Five-Year Plan provides for the following volume of production of equipment and metal products (including the output of repair shops):

GROSS OUTPUT

(in million rubles, in 1926-27 prices)

	1932	1937	1937 in % of 1932
P. C. of Heavy Industry	7,252.0	15,750	217.2
Other People's Commissariats and State organizations; handicraft and other co-operative and social organizations	2,158.0	3,750	173.8
Total	9,410.0	19,500	207.2

In 1937 the output of the machinery and metal products industry will considerably exceed the total output of heavy industry under the People's Commissariat of Heavy Industry in 1933 (15,537,200,000 rubles).

Among the various branches of machinery production under the People's Commissariat of Heavy Industry, the automobile and tractor industries as well as the production of transportation equipment and textile machinery will show the highest rates of growth. Under the Second Five-Year Plan the manufacture of motor vehicles is multiplying more than 8 times, of freight cars—5.3 times, of trunk line locomotives—3.4 times[1] and of textile machinery by specialized plants—5.8 times. The machine-tool and instruments industry is increasing its output 3.4 times, the machine-tool plants alone raising theirs more than 5 times. A high rate of development is exhibited in power plant equipment manufacturing, in the electric power and communication industries, in the various industries producing general machinery and metal products both for mass consumption and for industrial and construction purposes.

The planned rates of growth in the various branches of the machinery industry should lead to substantial changes in the structure of the industry:

	1932	1937
	in percentage of total	
Machinery and metal products industries under the P. C. of Heavy Industry	100.0	100.0
of which:		
Automobile and tractor industry	7.9	15.2
Transportation equipment, including electric locomotives and ships	10.7	15.9
Equipment for light industry and the food industry	1.7	3.2

Side by side with this large increase in the output of the main machinery plants under the People's Commissariat of Heavy In-

[1] Calculated in "E" and "SU" equivalents.

dustry, the quantity of metal products manufactured in the plants and auxiliary shops of other industries controlled by other People's Commissariats and organizations is growing considerably. The Plan provides that these plants be utilized to supplement the main machinery plants by doing repair work, producing spare parts as well as simple types of equipment and new types of machines experimental in character and manufactured in small quantities.

The proposed production program of the Plan for the supply of machinery ensures a sufficient volume of complete modern equipment for the country's industries, obtained by domestic production.

Nearly half of the total output of the machinery and metal-working industries is being directed toward the fulfilment of the plan of construction which will require equipment to the value of 9,400,000,000 rubles in 1937 compared with 3,600,000,000 rubles in 1932. The Plan provides for the re-equipping of every branch of Soviet national economy so that the latest technical achievements will be introduced in the shortest time possible.

The value of machinery allocated to construction in heavy industry is increasing from 1,400,000,000 rubles in 1932 (including imports) to 2,130,000,000 rubles in 1937. Despite the large absolute increase in the production of equipment, the fulfilment of the Plan for the supply of machinery to heavy industry during the first years of the Second Five-Year Plan period will require most strenuous effort, especially as regards equipment for the machinery industry (machine-tools, forge and foundry equipment), equipment for the chemical industry (pumps and compressors), engines (Diesels and locomobiles), and, pending the assimilation of the newly built gigantic heavy machinery plants, there will likewise be great tension in the supply of certain types of equipment for the iron and steel industry (rolling mills, etc.).

The main link in the plan of machinery production, the link which ensures the production of machines to make machines, *viz.*, the *machine-tool industry,* must be placed in a position where maximum development is possible, so that the machine-tool requirements of national economy can be met and the Soviet Union be made technically and economically independent in this field as well.

The Second Five-Year Plan provides for the manufacture of 40,000 metal-cutting machine-tools in 1937, an output numerically 2.7 times as great as in 1932 and representing a more than 5-fold increase in value, which testifies to a considerable change in the

types and efficiency of the machine-tools. It is planned to increase the percentage of high-efficiency machines, such as semi-automatic and automatic machines, grinding, milling and gear-cutting machines, etc. In 1937 the milling machines will constitute 12.0 per cent of the total output as compared with 3.8 per cent in 1932, the grinding and sharpening machines—9 per cent as against 3.9 per cent, turret lathes—10 per cent as against 4 per cent. The proportion of gear-cutting machines in 1937 will be 2 per cent and of automatic and semi-automatic machines—3.6 per cent of the total output.

The Second Five-Year Plan envisages the mastery of the production of up to 200 new types and sizes of machine-tools and the organization of the production of specialized machine-tools, and requires that their percentage of the total output be increased (particularly the output of heavy and special machine-tools for the manufacture of transportation equipment, and for the aviation and automobile industries). The Plan also provides for perfected and simplified designing of these machine-tools, for an increase in cutting speed, the introduction of individual electric drive, hydraulic transmission, etc.

In the last year of the Second Five-Year Plan period the specified output of machine-tools in the U.S.S.R. will provide metal-cutting machine-tools equal in number to between 12 to 15 per cent of all metal-cutting machine-tools installed by the beginning of of 1937.

The main production units of the machine-tool industry will be the plants whose reconstruction is nearing completion (the Red Proletarian Plant, the Sverdlov Plant, etc.) and the new plants for the production of turret lathes and milling machines; also the following factories which start operations during the Second Five-Year Plan period: a drilling machine plant in Kharkov, gear-cutting and grinding machinery plants, a new plant for the manufacture of heavy machine-tools, one for automatic machine-tools and one for experimental models and single orders for machine-tools in Moscow, etc.

A total of about 300,000,000 rubles will be invested in the fixed capital of the specialized machine-tool industry during the Second Five-Year Plan period. This represents a more than 3-fold increase in such investments made under the First Five-Year Plan. Moreover, there will be an increase in machine-tool construction in the general machine-building plants. About 30,000,000 rubles have

been assigned for capital investments which will go to increase the machine-tool production capacities of these plants.

Outlays for fixed capital in *tool production* will total 98,000,000 rubles, while on January 1, 1933, the entire fixed capital in this industry amounted to 70,000,000 rubles. The Plan specifies that the tool industry must master the production of a whole series of new types of measuring and cutting instruments formerly imported from abroad: special gauges, indicators, special drills, pneumatic appliances, etc. A great increase in the use of ultra-hard alloys is contemplated.

In connection with the development of mass production and the manufacture of precision instruments, the Plan calls for raising the value of the output of abrasive materials to 100,000,000 rubles in 1937 as compared with 29,400,000 rubles in 1932, while capital investments in the abrasive industry constitute 90,000,000 rubles.

In the *manufacture of power machinery* the Second Five-Year Plan provides the following production program for the main types of equipment:

Indices	Units of measurement	1932	1937	1937 in % of 1932
Steam boilers	thousand m^2	115.8	385	332.5
Turbines	thousand kw.	314.0	1,500	477.8
Internal combustion engines	thousand h. p.	182.0	2,500	1,373.6

The planned volume of power machinery production will fully satisfy the requirements of power construction.

The manufacture of *boilers* and all their accessories is being mastered during the Second Five-Year Plan period. Moreover, there must be a decided improvement in quality: in boiler capacity, steam production and increased boiler pressure. The kinds of fuel employed will increase in number; mechanization of the boiler rooms will be improved.

In the Second Five-Year Plan period, development of the production of *internal combustion engines* is of tremendous importance.

The present type of carburettor engine is being improved by reducing its weight, increasing its power, strength of design, durability, etc.; also by further differentiation in the rating and speed of motors to adapt them to the needs of the various branches of production and transportation.

The designing of light two and four-cycle compressorless Diesel engines to be specially built for the automobile and tractor industries as well as for aviation must be completed, and the serial and mass production of these engines must be organized during the Second Five-Year Plan period. At the same time it is planned to reorganize the production of heavy Diesels by expanding the manufacture of two and four-cycle Diesel engines of various speed and power ranges and the manufacture of Soviet types of locomotive, marine and stationary Diesels.

In the Second Five-Year Plan period the *electrical machinery industry* must solve a number of new technical problems. In order to meet the power requirements of the country, the electrical industry must master the production of new types of 50,000 kw. turbo-generators of higher r.p.m., and of powerful new 100,000 kw. turbo-generator units. It must raise the volume of output of high-power transformers with voltage ratings of 110,000-220,000 volts; produce more oil circuit breakers with a flash-over rating of 1,500,000 to 2,500,000 kw. for voltages of 110,000-220,000 volts. It must start the large-scale production of powerful synchronous condensers with a capacity of from 25,000 to 50,000 kw. per unit, as well as mass production of fixed condensers.

The following production problems must be solved in order to satisfy the requirements of the remaining branches of industry: the increased manufacture of electric mine hoists and of electrical equipment for blooming and rolling mills, for coal-cutting machines, mining combines, etc.; the production of electric furnaces, mercury-arc rectifiers and other complex electrical equipment for the production of special steels, non-ferrous metals and chemicals; improvement of electrical welding apparatus; introduction of electric motor drive and electric tools; extensive production of relays and apparatus for the automatic control of machinery.

The production of equipment for the *fuel* industry will undergo especially rapid development as regards the oil and peat industries which will receive three times as much equipment as in 1932.

In the field of machinery production for the oil industry, the Tiflis Plant for the manufacture of oil drilling equipment is beginning operations, while the reconstruction of the Schmidt Plant in Baku, the Red Hammer Plant in Grozny and the plant in Podolsk for the manufacture of cracking apparatus is being completed and a new factory for the production of drilling equipment is being erected.

Here a great task must be faced: that of mastering the mass production of modern types of equipment to raise drilling speed, improve oil-well exploitation and oil refining (powerful suction dredges, powerful preventors, profile chisels, etc.).

The peat-machinery industry will have to ensure the output of complete equipment for the hydro-peat and milled-peat operations as well as peat-moulding and dredging machines. The newly erected Ivanovo Plant which is specializing in the manufacture of peat machinery is becoming the principal source of supply of such machinery during the Second Five-Year Plan period.

The Plan provides for the manufacture of equipment for the complete mechanization of the coal-mining industry and the accelerated production of mining combines, powerful hoists, loading apparatus, machines for back-filling excavations, etc. The production of equipment for concentrating ores is being increased. In 1935 the first section of the Novosibirsk Mining Equipment Plant is being put into operation.

The production of *metallurgical equipment* will be centred chiefly in the newly built Ural and Kramatorsk Works. Both these giants receive about 300,000,000 rubles for construction during the Second Five-Year Plan period. In 1937 the total output of heavy machinery plants will be more than two and a half times as great as in 1932, with the operation of the Ural and Kramatorsk plants mastered to the extent of 70 to 75 per cent of capacity. The production of new types of rolling mills, powerful cranes, etc., must be mastered in order to turn out a complete line of equipment.

The powerful and multifarious equipment of the Ural and Kramatorsk Plants must be used to produce big and heavy parts for shipment to plants with which they are co-operating (turbine and generator shafts, parts of heavy machine-tools, excavators, etc.).

A most important task in the manufacture of *chemical apparatus* during the Second Five-Year Plan period is the widespread introduction of materials suitable for the technological processes of the chemical industry (heat and acid-proof alloy steels, special alloys and metals resistant to various chemical processes, aluminium alloys, etc.).

The production of apparatus for chemical processes must embrace every type of apparatus for oxidation, hydration, chlorination, nitration, etc., the production of accessories and supplies such as filters (particularly the latest vacuum filters), filter-presses, etc.

As regards the other branches of heavy industry, the Plan provides that their supply of machinery be considerably increased and that the Soviet machinery industry master the production of a large number of new, technically up-to-date types of equipment.

During the Second Five-Year Plan period the *timber industry* will also receive an increasing supply of machinery. This involves the extended reproduction of floating, loading, unloading and other equipment ensuring a high degree of mechanization in the hauling, floating and stripping of timber. At the same time the Plan provides for a sufficient supply of equipment for the wood-working industry (mastering the production of pin-cutting and other high-efficiency machines) and the organization of the production of equipment for the paper industry (paper-mill machinery, etc.).

By 1937 the total volume of lumbering equipment and of equipment for the other industries under the People's Commissariat of Timber will have increased to more than 4 times the figure for 1932.

The rapid rise in the output of light industry under the Second Five-Year Plan requires a considerable augmentation of its technical equipment.

The Plan therefore provides for a sharp increase in the production of equipment for *light industry*. The output of the specialized textile machinery plants which was valued at 60,000,000 rubles in 1932 is scheduled to reach 350,000,000 rubles in 1937. The output of textile machines (according to the People's Commissariat of Heavy Industry) will grow in the following proportions:

	1933	1937
Water spinning frames for all fibres (reduced to std. cotton spinning high-stretch w. frames)	333	6,500
Looms (reduced to 89 cm. automatic cotton looms)	2,130	32,000

In order to raise the production of textile machinery to such an extent it will be necessary to load the existing plants to the maximum, to remodel them within the shortest possible time and put into operation a number of new factories (utilizing vacant factory buildings or those working far below capacity in order to speed up construction). At the same time it will be necessary to make wide use of the production facilities of the general machinery plants.

It will require great effort to fulfil the task of supplying equipment for the textile industry. This can only be done by properly manoeuvring with the production capacity available and rapidly developing the textile machinery industry.

In addition to mastering the production of the most modern equipment for the cotton goods industry (modern ring spindles, single-beater scutchers, automatic looms, etc.), the Plan provides for a large rise in the output of equipment for bast fibres. During the Second Five-Year Plan period it will likewise be necessary to master the production of all necessary equipment for the manufacture of woollens and knit goods, and for other branches of light industry.

Among the new machines to be put into operation during the Second Five-Year Plan period special mention must be made of ring spindles for the cotton goods industry equipped with high and extra-high stretch frames, linen water frames designed by Zvorykin, wool-spinning frames designed by Khrushchov, high-speed winding and warping machines for all fibres, automatic looms, combers for cotton and wool, etc.

The output of equipment for the leather and shoe industry is quadrupling in the five-year period. New types of machinery are being turned out, thereby ensuring the mechanization of the majority of those processes which are laborious and harmful to workers' health.

In addition to what it receives from the enterprises of heavy industry, light industry is also receiving supplies (primarily parts) from machinery and metal-working plants operated by the People's Commissariat of Light Industry.

In 1937 the output of the machinery and metal-working plants of the People's Commissariat of Light Industry (including the production of card slivers and knitting needles) will be 2.4 times the 1932 level.

The production of complete equipment for the grain products industry (equipment for elevators, flour mills, vegetable oil and bread factories, etc.) was mastered during the First Five-Year Plan period. During the present five-year period the *food machinery industry* must, in addition, master the manufacture of complete equipment for the meat, the canned goods and the starch and molasses industries as well as the industries utilizing waste products. The manufacture of the most complex automatic machines for dressing fish, for manufacturing cans, for automatic filling and hermetic sealing of tin and glass containers, for washing containers, etc., is being mastered and these machines are being applied in practice. During the Second Five-Year Plan period the output of the specialized food-machinery plants is increasing 2.7 times (from 47,700,000 rubles in 1932 to 130,000,000 rubles in

1937). Besides, equipment for the manufacture of sugar, alcohol, etc., is being turned out by the plants producing chemical apparatus. In the shipyards trawlers are being built for the fishing industry. Aside from producing equipment for the large units of the food industry, the machinery industry must design and organize the manufacture of equipment for stationary and portable food establishments for State and collective farms and small settlements. The production of equipment for public catering is undergoing rapid development accompanied by considerable improvement in quality. In addition, it is proposed to double the production of the metal works, repair shops and shipyards controlled by the People's Commissariat of Supply.

During the First Five-Year Plan period the Soviet Union created the largest *agricultural-machinery industry* in the world. The Second Five-Year Plan provides for increasing the value of agricultural machinery supplied (all forms, including tractors but excluding motor vehicles and their spare parts) to 1,460,000,000 rubles by 1937.

The total tractor output during the Second Five-Year Plan period will be three times the aggregate power of all tractors at the end of the First Five-Year Plan period, and in the last year of the Second Five-Year Plan period the annual tractor output will exceed in power that of the total number of tractors at the beginning of this period.

The following establishments are to manufacture tractors:

The Kharkov Plant, which manufactures 15 h.p. tractors and has a plan calling for 36,000 tractors (besides spare parts) in 1937;

The Chelyabinsk Plant, which manufactures 48 h.p. caterpillar tractors, will produce 20,000 machines and a quantity of spare parts in 1937;

The Stalingrad Plant, which is being reconstructed to produce caterpillar tractors and will manufacture 22,500 machines in 1937.

In addition, special types of tractors for row crops are being produced by the Red Putilov Plant, which was scheduled to turn out the first lot in 1934 and will bring up their production to 10,000 in 1937.

The Second Five-Year Plan is marked by the manufacture of more powerful caterpillar tractors which in power will constitute three-quarters of the total scheduled tractor output in 1937.

The U.S.S.R. occupies first place in the world in concentration of tractor production. In 1937, 4 Soviet tractor plants alone will

produce 88,500 tractors having an aggregate of 2,500,000 h.p. The specialization of tractor production in the U.S.S.R. may be characterized by the fact that only 4 types of tractors will be produced here during the Second Five-Year Plan period as compared with eighty types produced in the U.S.A. in 1929.[1]

The average tractor power in the U.S.S.R. is higher than in the capitalist countries. In 1937 the average power of a tractor delivered to the shaft will be over 40 h.p. in the U.S.S.R. as compared with 26 h.p. in the United States in 1929.

The value of the output of agricultural machines and implements (horse-drawn vehicles, equipment for poultry raising and the primary working up of raw materials, etc.) will amount to 2,600,000,000 rubles according to the Plan. As a result the available total of agricultural machinery is being doubled, while the production of harvesting machines for grain and industrial crops as well as of cultivators for the latter is growing with particular speed.

The number of grain harvester-combines to be produced during the Second Five-Year Plan period is planned to reach 78,600 against 14,000 (in actual units) under the First Five-Year Plan. The output of tractor-drawn ploughs (in terms of one-furrow ploughs) is growing from 180,000 in 1932 to 470,000 in 1937.

The Second Five-Year Plan provides for a rapid growth in the production of agricultural machines used to mechanize the cultivation of industrial crops. The proportion which these machines form of the total volume of Soviet-made agricultural machinery is growing from 4 per cent during the First Five-Year Plan period to 13 per cent during the Second.

The paramount task to be performed by the agricultural-machinery industry is the manufacture of the necessary implements to improve the quality of soil cultivation. This is to be accomplished by the introduction of strict differentiation of the tractor-drawn implements in accordance with the scientific requirements for treating the different soils, for different conditions of cultivation, the rational use and more extensive assortment of ploughs—both bladed and special—and the designing of deep and surface cultivators to combat weeds.

Agriculture is scheduled to receive 170,000 motor vehicles during the Second Five-Year Plan period.

The planned value of horse-drawn vehicles to be produced in

[1] According to data of *Automotive Industries*.

1937 (including the output of handicraft co-operatives) will exceed 150,000,000 rubles.

Much progress in the supply of machinery for all types of *transportation* is contemplated by the Plan. The supply of railroad equipment is scheduled to grow from 320,000,000 rubles in 1932 to 1,500,000,000 rubles in 1937.

In the Second Five-Year Plan period powerful locomotives of the new "FD"[1] type (1-5-2, with a load of 20 tons per axle) and the "JS"[2] type (1-4-2) as well as Diesel and electric locomotives are beginning to be produced on an extensive scale.

Output of High Power Locomotives (actual units)

Classification of locomotives	1932	1937	Total for the five years
"FD" freight locomotives	1	925	2,375
"JS" passenger locomotives	1	200	255
Trunk line Diesel locomotives	1	110	248
Trunk line electric locomotives	1	150	350

The total locomotive construction program of the Second Five-Year Plan is 3.3 times as large as that of the First Five-Year Plan and provides for the following output:

(actual units)

Freight locomotives	5,861
Passenger locomotives	1,885
Trunk line Diesel locomotives	248
Trunk line electric locomotives	350

The freight locomotives to be supplied to the railroads under the Second Five-Year Plan (calculated in "E" type locomotive equivalents) will exceed the number of locomotives at the beginning of 1933 by 52 per cent, while the output of passenger locomotives (in standard "SU" equivalents) will increase the hauling capacity of the existing passenger engines by 64.2 per cent.

In 1937 it is planned to produce 110,000 freight cars for the People's Commissariat of Transportation (in 2-axle equivalents),[3] and during the whole of the Five-Year Plan period a total of 273,000 "NKPS" freight cars having an increased load capacity will be turned out. (The average load capacity of a conventional 2-axle car is rising from 21 tons in 1932 to 24 tons in 1937 while the average capacity of the actual freight car is increasing from 29 tons in 1932 to 47 tons in 1937.)

[1] Felix Dzerzhinsky.

[2] Joseph Stalin.

[3] The total number will be 118,400, if cars specialized industrial use are included.

During the second half of the Second Five-Year Plan period the car-building industry will concentrate mainly on the production of 4-axle cars. The number of special cars (tank-cars, refrigerator cars, etc.) and open cars (flat cars, gondolas, hoppers) will be sharply increased. Dumpcars will constitute 43 per cent of the load capacity of the freight cars to be produced in the Soviet Union in 1937 (compared with 20.8 per cent in 1932). The aggregate load capacity of all freight cars is growing by more than 65 per cent during the Five-Year Plan period.

The output of passenger cars will be more than tripled by 1937 when compared with 1932 (rising from 1,133 to 3,500 cars for the respective years).

During the Second Five-Year Plan period notable progress is scheduled to be made in supplying equipment for industrial and intra-plant transportation. The plan for 1937 calls for the production of 400 electric mine and industrial locomotives, 300 narrow-gauge locomotives, 400 wide-gauge industrial locomotives and 1,400 internal combustion locomotives (for industry as well as for switching on the railroads controlled by the People's Commissariat of Transportation). The production of industrial freight cars will grow from 1,700 (in 2-axle car equivalents) in 1932 to 8,400 in 1937.

The *shipbuilding* industry, which is well equipped materially and technically (possessing 10 maritime and 12 river yards) and has a considerable body of highly skilled workers and specialists, is scheduled to increase its output 3.2-fold during the Second Five-Year Plan period.

The Plan provides for the construction of more complex and technically more highly perfected ships. Chiefly sea-going cargo-and-passenger boats will be built as well as powerful high-speed tugs equipped with the latest engines. The Second Five-Year Plan contemplates the building of maritime transport vessels representing a total water displacement of 626,000 tons.

River shipbuilding will also be considerably developed during the Second Five-Year Plan period. The production of self-propelled river craft in shipyards under the People's Commissariat of Heavy Industry is multiplying 4.2 times during the Second Five-Year Plan period (mounting from 21,300 i.h.p. in 1932 to 89,100 i.h.p. in 1937) while the production of propelled metal river craft is to grow 2.7-fold (from 116,600 tons in 1932 to 316,500 tons in 1937).

In order to put an end to the lag in the production of mechanical appliances behind that of hulls, the Plan provides that the

Sormovo Plant specialize in shipbuilding and that the mechanical shops at the shipyards be considerably developed.

The use of electric welding, sectional assembly of ships, lighter alloys, special grades of metal possessing superior technical properties, plastic materials, new mechanisms and devices, the installation of new types of engines (Diesels and turbo-electric engines) will make it possible to ensure that the Soviet fleet will attain the highest technical level.

In addition to developing shipbuilding in the yards and plants of the People's Commissariat of Heavy Industry, the Plan provides that the repair yards of the People's Commissariat of Waterway Transportation be utilized to build new vessels (self-propelled ships with a total capacity of 70,000 i.h.p. during the five years), and specifies that small wooden boats be built in the yards of the waterway transportation system, fishing industries, timber co-operatives, etc.

The *automobile industry* plans to increase its output from 23,900 vehicles in 1932 to 200,000 vehicles in 1937, a more than 8-fold increase.

The characteristic feature of the plan for the automobile industry during the Second Five-Year Plan period consists in the combination of particularly speedy development of production and very extensive new construction.

The decision of the Communist Party and the Government to bring the output of motor vehicles up to 630,000 per year in the Third Five-Year Plan period will be carried into effect in two stages.

In the first stage, the existing plants are being enlarged and the new heavy truck plant at Yaroslavl is being put into operation. This project provides the plant capacity required to fulfil the production program of the Second Five-Year Plan.

The second stage of the construction program (2 new plants to manufacture 3-ton trucks, one plant to manufacture 5-ton trucks, etc.) is also being carried out during the Second Five-Year Plan period. The construction of these plants will be completed and capacity production mastered after the expiration of the Second Five-Year Plan period. During the Second Five-Year Plan period the output of the automobile industry is characterized by the high percentage (more than 70 per cent of all motor vehicles) of trucks produced.

As regards passenger cars, it is planned to begin production

of cars with high piston displacement and closed rigid bodies, in addition to the motor vehicles already being manufactured at the Gorky Plant. The heavy cars will have to change from carburettor engines to high-speed Diesels.

The automobile industry of the U.S.S.R. is reaching a higher level of standardization and specialization during the Second Five-Year Plan period than is attainable under capitalism. The automobile plants of the U.S.S.R. produce 5 basic types of trucks and passenger cars. In the capitalist countries, on the contrary, the automobile factories are manufacturing a great many different types and makes of cars. Thus, in 1930 the 16 passenger-car plants of Germany produced 42 different basic types and 6 sub-types of passenger cars, while the 17 truck factories produced 75 different basic types and 12 sub-types of trucks.

A vital problem connected with the improvement in the quality of the machines produced and essential to ensuring quantitative fulfilment of the production program consists in raising the capacity of co-operating plants during the Second Five-Year Plan period so that they may be in keeping with the high technical level of equipment of the newly built automobile plants.

In the field of *communication, signalling and radio broadcasting* the Plan provides for a 2.7-fold increase in production (from 238,000,000 rubles in 1932 to 650,000,000 rubles in 1937). Under the Second Five-Year Plan the lag in the output of radio receiving sets behind that of radio broadcasting station equipment is being eliminated. The output of radio tube receivers, including complete sets of tubes (8,500,000 in 1937), reproducers and other parts, is to reach 500,000 in 1937 (more than 17 times the 1932 output). The installation of dial telephone exchanges is also increasing.

In the Second Five-Year Plan period the electrical communication industry must ensure:

1) The design and production of new types of dial telephone exchanges and of apparatus for multiplex telephony and telegraphy;

2) The introduction of new types of high-speed telegraph apparatus;

3) The extensive development of production of short-wave and ultra-short-wave radio stations, the production of improved and more powerful radio tubes, the mastery of the production of metal power vacuum tubes, the organization of the production of precision radio measuring instruments, etc.

The plan of construction in the electrical communication industry provides for a 3-fold increase in its production capacity by the end of the Second Five-Year Plan period, including the creation of a considerable reserve capacity.

The production program of many branches of the machinery industry includes as one of its most important provisions the manufacture of equipment for the *mechanization of laborious processes*. The planned increase in the output of mining equipment, peat machines, timbering equipment, etc., constitutes the basis for the mechanization of these processes. In addition such labour-saving equipment is also being manufactured in increasing quantities in factories producing hoisting and conveying machinery as well as equipment for intra-plant transportation, the manufacture of building materials and machinery, and road building machines. Labour-saving machinery is also being manufactured by the factories under the control of the respective Republics, and by the auxiliary plants under the People's Commissariats of Timber, of Transportation, etc.

The number of excavators of various types manufactured will increase to 1,000 in 1937. The Ural Heavy Machinery Plant equipped with a special excavator manufacturing shop, the Votkinsk Plant, the Novosibirsk Mining Equipment Plant which is being put in operation during the Second Five-Year Plan period, the Kovrov Plant and the Red Metal Worker Plant at Kostroma will be the principal enterprises manufacturing excavators. In 1937 the output of various types of equipment mechanizing laborious processes will be more than twice as great as in 1932.

A large increase is planned in the production of *safety equipment* for the various branches of national economy. Prominent among these is gas-proof apparatus for mining operations, particularly coal mining.

The plan of the machinery industry provides that the requirements of the rapidly growing *municipal and housing construction* be fully satisfied. During the Second Five-Year Plan period it is proposed to organize the production of electric cars and all other equipment necessary for the Moscow subway. The production of street cars is rising from 8,000 to 15,000, of autobuses—more than 5-fold. The cities will receive a large number of taxis and trucks for hire. The manufacture of trolley buses is being organized; water supply and sewage systems are sharply increasing in number.

The production of equipment for municipal services (in specialized plants) is nearly tripling, rising in value from 41,600,000 rubles in 1932 to 120,000,000 rubles in 1937.

The extensive reconstruction of the Voykov Plant (producing steam radiators and central heating boilers) and of the Myshega Plant (producing water pipes and fittings) is being completed, and new factories and shops for the production of radiators, bathtubs and sewer pipes are being built. These plants are mastering the production of a number of newly perfected types of manufactures, such as steam radiators with a higher heat transfer coefficient, improved central heating boilers which save up to 40 per cent of metal and up to 15 per cent of fuel, etc.

In addition there is the planned extensive development of municipal service equipment manufacturing (equipment and supplies for laundries, bath houses, central heating plants, etc.) in enterprises of local industry.

The elevation of the Soviet machinery industry to a higher level in consequence of the introduction of more complex and more efficient machines is creating a considerably increased demand for *precision machinery and instruments*, the production of which was inaugurated under the First Five-Year Plan.

In the Second Five-Year Plan period the precision machinery industry will be further developed to supply high-efficiency appliances that until recently were imported in large quantities from abroad, and to meet the growing cultural and everyday demands of the toiling masses.

The output of the precision machinery and instruments industry is planned to grow almost 2-fold in value during the Second Five-Year Plan period, from 241,000,000 rubles in 1932 to 450,000,000 rubles in 1937. The list of new articles to be produced under the Second Five-Year Plan includes the following:

1) Apparatus for the automatic regulation and control of various technological processes such as: metallurgical (blast and open-hearth furnaces), chemical, electrical engineering (recording potentiometers, optical pyrometers, surface thermocouples), complete automatic operation of cracking and other oil-refining processes, metal testing instruments (automatic Brinell hardness testers, Amsler instruments, etc.), various types of dynamometers used in the production of textiles, paper, leather, etc.;

2) Aviation instruments and accessories for new types of automobiles;

3) Automatic metereological instruments (remote electroanemometers, metereological instruments for the Far North);

4) Complex calculating machines, including analytical computing machines of every description.

All the above items will greatly raise the technical equipment of Soviet industry and Soviet national economy in general.

The production of *metal products for industry and construction* (bolts, nuts, nails, cold rolled steel strips, etc.) has lagged far behind the general development of the machinery industry during the past years. The Second Five-Year Plan makes provision for the abolition of this backwardness.

In 1937 the output of industrial and constructional metal products will be more than 2.5 times that of 1932. The production of telegraph wire will increase more than 3.5-fold (from 21,000 tons to 75,000 tons). The output of cold rolled steel strips will go up more than five times (from 13,100 tons to 70,000 tons), etc. In addition to the existing plants the Five-Year Plan provides for the construction of new powerful factories for drawing steel wire and cold rolled steel strips (in the Ukraine).

The creation in the Soviet Union of an extensive base for the production of high grade machinery affords new opportunities to improve the cultural and social services extended to the great masses of toilers by sharply increasing the supply of *metal products for mass consumption.*

A sharp increase is being registered in the rate of output of the more complex manufactured articles of general consumption, such as bicycles, radio sets, electric heating and household utensils, photographic apparatus, etc. The Plan provides for an increase in 1937 in the production of general-consumption metal ware by the factories under the People's Commissariat of Heavy Industry equal to 3.6 times the 1932 output and specifies a considerable improvement in the quality and variety of goods produced. The share of metal products of general consumption in the whole of the machinery and the metal products industry under the People's Commissariat of Heavy Industry is rising from 6 per cent in 1932 to 10 per cent in 1937. The output of bicycles is scheduled to grow 4.5-fold in comparison with 1932 (from 128,000 in 1932 to 575,000 in 1937), the production of watches—4.8-fold (from 20,800,000 rubles' worth in 1932 to 100,000,000 rubles' worth in 1937), of electric lamps for lighting purposes—3.3-fold (from 48,200,000 to 160,000,000), of photographic apparatus—12-fold (from 12,000 to

140,000), of phonographs—46-fold (from 26,000 to 1,200,000), phonograph records—more than 23-fold (to 40,000,000), radio tubes—more than 17-fold (500,000 in 1937), metal beds—3.4-fold (1,700,000 in 1937), metal dishes—4-fold (from 38,300,000 rubles' worth in 1932 to 150,000,000 rubles' worth in 1937), the proportion of enamelled, aluminium and other high-grade utensils growing particularly.

Local industry is considerably increasing its output of metal ware for general consumption. The handicraft co-operatives must also play a considerable part in the production of consumers' metal goods.

* * *

The proportionately large output of the new and radically reconstructed machinery plants, the new technique and organization of production in these plants and the huge production quotas assigned to the new kinds and types of machines squarely confront the machinery industry with the urgent task of *mastering the new technique* and organizing capacity production in the *new factories.*

Within the more limited scope of the various factories that account for about 80 per cent of the output of industry under all-Union control included in the machinery production system of the People's Commissariat of Heavy Industry, the bulk of the output in 1937—more than 90 per cent of it—will be produced in new or recently reconstructed enterprises.

The Second Five-Year Plan devotes special attention to improving the utilization of factory equipment (increasing the speed of cutting instruments, raising the use factor of machine-tools, using machines for the specific purpose intended, increasing the efficiency of machinery by introducing a maximum of special devices, etc.). A higher equipment use factor is of special importance in such complex machines as gear cutters, special machine-tools, big vertical boring and turning machines, etc., which at the beginning of the Second Five-Year Plan period obviously did not work to full capacity.

Learning to operate the newly-built and reconstructed plants at full capacity and effectively introducing the latest technical achievements in production processes are dependent upon the application of a complete system of organizational and technical measures, the most important of which are as follows:

1) Co-ordination of the technological process, particularly in reconstructed plants, with the recently installed equipment;

2) Elimination of the disparity in output between the preparatory and the manufacturing departments. This is accomplished both by eliminating the "tight spots" in the factories and by co-operation among the various machinery plants, as well as co-operation between these plants and the specialized plants producing castings and certain parts;

3) Organization and rationalization of the tool, pattern and die departments, proper organization of intra-factory transportation, efficient organization of repairs of equipment and the most extensive use of measuring instruments and appliances;

4) A decisive increase in the number of engineers and technicians at the factories and a radical improvement in the work of the designing bureaus, which must be brought nearer to the factory or shop concerned;

5) A radical improvement in the organization of the work of factory laboratories and an enhancement of their importance, to be coupled with the practical application in the factories of the results achieved by the scientific research institutes.

The superiority of the socialist machinery industry makes possible the extensive application of the principles of specialization and of co-operation in production. The Plan stresses above all specialization and co-operation in the preparatory processes of machinery production.

At the same time, the Plan provides for the development of the enterprises built during the First Five-Year Plan period for the production of special parts (ball and roller bearings, chucks for metal-cutting machines, Gall's chains, etc.) and the further organization of specialized production of the most widely used parts (shafts, gears, including reduction gears, bushings and other standard parts, boiler and other fittings, etc.); also bolts and rivets of various sizes.

On the basis of increased specialization in the machinery industry, it is planned to establish co-operation among machinery plants of various branches of industry and among such plants within the same branch of industry. Thus, for instance, the Gorky Milling-Machine Works will supply other machine-tool works with gears; the Samara Carburettor Works and the Banner of Labour Plant in Leningrad will supply the automobile and tractor plants with carburettors, and so on. It is planned to establish an extensive system of co-operation in supplying the shipyards with nautical instruments, the railroad equipment industry with car under-frames,

centre pins and other semi-finished products, and the automobile industry with wheels and springs.

Specialization in the machinery industry is accompanied during the Second Five-Year Plan period by combination of the machinery industry and the iron and steel industry. Two new-type combinations of the iron and steel industry and the machinery industry—the Nizhni Tagil and the Kramatorsk Combinations—are nearing completion. In these combinations extensive use will be made of technological interconnections between metal manufacturing and the preparatory processes of machinery production. In West Siberia the Stalinsk (Kuznetsk) Metallurgical and Transportation Equipment Combination (manufacturing locomotives and railroad cars) is under construction. It will have common shops to do the preparatory work for both the locomotive and the car-building departments. At the same time there must be accomplished the task of concentrating some of the preparatory processes at certain iron and steel works, particularly those processes which can be carried on on the largest scale.

In addition to mapping out extensive work on *standardizing the designing of machinery*, the Second Five-Year Plan provides for a much more inclusive list of kinds of machinery to be produced. This is imperative in order that the technique of producing every kind of equipment necessary for all branches of national economy may be mastered. Thus, it is planned to produce in 1937 about 800 different kinds of machinery for the food industry, 400 of which will be new types the production of which must be mastered during the Second Five-Year Plan period. The textile machinery industry, producing about 200 kinds of machinery, must master the production of 80 new kinds; the leather and shoe machinery industry which turned out 43 kinds of machines in 1932 must master the production of more than 100 new kinds during the Second Five-Year Plan period; in the equipping of the timber and paper industry, for which about 60 types of machines were available in 1932, about 200 new types are to be mastered, according to the Plan. The chief tool-making plants producing 60 kinds of tools are to master the output of 80 new types. The machine-tool industry must learn to master the output of up to 200 new types and sizes of machine-tools. The automotive industry is to master the production of passenger cars with high piston displacement, passenger cars with rigid bodies, three-ton trucks, and so on.

It is a most important task of all machinery plants to perfect the types and designs of equipment produced, thus securing greater efficiency, to reduce the standard fuel consumption of engines, reduce costs and speed up the cycle of production.

The Plan maps out an 85 per cent increase in *labour productivity* in the machinery industry during the Second Five-Year Plan period.

The per capita output at the new enterprises shows that there are great possibilities for increasing labour productivity.

AVERAGE ANNUAL OUTPUT OF NEW ENTERPRISES
(per worker, in rubles, in 1926-27 prices)[1]

Plants	1932	1933	1937	1937 in % of 1932
Sverdlovsk Heavy Machinery Plant	4,168	4,985	10,786	258.8
Lugansk Locomotive Plant	5,119	7,035	11,476	224.2
Molotov Automobile Plant at Gorky	5,129	10,838	18,425	359.2
Chelyabinsk Tractor Plant	—	7,912	22,387	282.0[2]
Kharkov Tractor Plant .	8,282	12,142	20,200	243.9

[1] This table is based on the preliminary projects drawn up by the boards and trusts of the People's Commissariat of Heavy Industry and is submitted merely for the purpose of illustration.
[2] Percentage of 1933, the first year of operation.

It is planned to reduce the *cost of production* in the machinery industry by 40 per cent.

The reduction in the cost of production will be effected by reducing the weight of the machinery produced which will cut down metal consumption 20 per cent, by substituting ferrous for non-ferrous metals, plastic masses for metals, etc.; by making extensive use of welding, reducing grinding allowances, etc., receiving calibrated raw material and complete supplies of metal and metal products.

The total reduction in the cost of production per unit of output derived from the economical use of materials as well as lowered overhead expenses will amount to about 37 per cent.

In addition to the growth of production and to mastering the new technique and the manufacture of new products, the Plan provides for a further increase in *construction* in the machinery industry during the Second Five-Year Plan period, entailing investments amounting to over 8,000,000,000 rubles.

Besides completing the construction jobs begun during the period of the First Five-Year Plan, it is contemplated to develop new construction on a large scale. New construction is under way on about 50 new enterprises, estimated to cost approximately 4,000,000,000 rubles.

In determining the new enterprises to be built, the assigned quotas of output and the existing capacities of the specialized enterprises of the machinery production branches concerned were taken as the basis. By ascertaining the additional capacities which can be obtained in certain branches of machinery production through further specialization and co-operation among the various enterprises, by partly shifting certain plants to the manufacture of other products necessitated by a change in demand, and by changing the organization and technology of the process of production it will be possible to provide national economy with the required output of these certain branches of machinery production without building this or that new enterprise during this Five-Year Plan period, or it will be possible to change the time limits fixed for their construction. For the reasons assigned, some of the new industrial construction projects (a flour mill equipment plant, a steam radiator plant, a Diesel engine plant and others) have been included in the Plan only tentatively.

ALLOCATION OF CONSTRUCTION IN THE MACHINERY INDUSTRY

	Million rubles	Percentage of total under First Five-Year Plan	Percentage of total under Second Five-Year Plan
New construction . . .	5,630	45.3	69.8
Extension and reconstruction	1,400	46.0	17.4
General overhauling . . .	580	5.0	7.2
Miscellaneous investments	450	3.7	5.6
Total	8,060	100.0	100.0

The decrease in the percentage of capital invested in extension and reconstruction is accounted for by the fact that the principal extension and reconstruction jobs on the existing machinery plants have been completed.

The leading item in the plan of constructions is construction for the machine-tool industry. This forms the most important task in the general program of construction, both with regard to the technical equipment of the machinery and metal-working industry as a whole, and with regard to consolidating the technical and

economic independence of the U.S.S.R. The Plan provides for the completion of the reconstruction of the existing enterprises (some of which have actually been created anew) and the construction of a number of new enterprises. Under construction are two grinding machine plants, an automatic machinery plant, a heavy machine-tool plant (to work in co-operation with the Ural Machinery Plant), a gear-cutting machine plant and a number of shops engaged in work of a preparatory and auxiliary nature (production of machine-tool castings, gears and standard parts).

The further development of the machinery plants to be available for the manufacture of rail, water and motor-transportation equipment presents a most important problem in the plan of construction. It is contemplated to build a number of new works besides completing those begun during the First Five-Year Plan period.

In the sphere of *railroad transportation,* the construction of the Lugansk Locomotive Plant is nearing completion, and the Orsk, Stalinsk (Kuznetsk) and Novocherkassk Locomotive Plants and the Kashira Electric Locomotive Plant are in the course of construction. This will secure an increase in the potential output of trunk line locomotives from 1,265 in 1932 to 4,050 [1] at the end of the Second Five-Year Plan period.

In the railroad car manufacturing industry the reconstruction of all the existing works is approaching completion, the new powerful Nizhni Tagil Plant producing large-size freight cars is being put into operation, and in 1936 the construction of the car-building plants at Stalinsk (Kuznetsk) and Irkutsk will be commenced. Each of these plants will have a capacity of 10,000 large-size cars. Freight car output capacity is increasing from 40,000 cars in 1932 to 155,000 cars in 1937 (in 2-axle equivalents). The Kazan Plant, when completed, will serve as a huge passenger car manufacturing base. The output of this plant at full capacity will considerably exceed that of all existing passenger car plants in the aggregate. The reconstruction of the Mytishchi Plant will create a base for the production of rolling stock for *electric* railways, *subways* and *street car lines.*

In the sphere of *shipbuilding,* it is proposed fully to complete the reconstruction of maritime and river shipyards, to put the Amur Shipyards into operation, to strengthen the existing repair

[1] Using a coefficient of 1.5 for "FD" and "JS" locomotives and a coefficient of 2 for electric locomotives.

docks and create new ones. Plants for the building of metal and wooden cutters are being set up.

The capital investments in the *automobile industry* are designed to create a large-scale Soviet base for the manufacture of motor vehicles. By the end of the Second Five-Year Plan period this industry will have a capacity of 360,000 cars and trucks, and of 630,000 cars and trucks when all the planned construction will be completed, as against 92,000 motor vehicles in 1932.

The plants of this industry are being considerably enlarged and two new plants of 100,000 3-ton truck annua! capacity each and two of 25,000 5-ton truck annual capacity each are under construction. Besides, it is proposed to build a group of plants to cooperate in fulfilling the extensive program of automotive construction—a new plant producing ball and roller bearings, plants producing electrical supplies for automobiles and tractors and automobile batteries, also automobile assembly plants.

During the Second Five-Year Plan period 3,800,000,000 rubles, or about half of the total investment in the machinery industry, are being put into the manufacture of transportation equipment, including the production of electric locomotives, ships and motor vehicles.

The capacity of the *tractor plants* is increasing from 1,200,000 h.p. at the end of 1932, to 4,150,000 h.p. in 1937—a more than 3.5-fold gain.

The construction of the Chelyabinsk Plant with a capacity of 40,000 caterpillar tractors is being completed, while the Stalingrad Plant is being radically reconstructed to provide for an output of 40,000 caterpillar tractors.

The growing demand for electrical equipment necessitates the construction of new enterprises in the *electrical engineering* industry (plants producing high-voltage equipment and transformers, and a number of auxiliary enterprises producing insulating material, carbon electrodes, etc.) which will fill in the gaps in the production of electrical equipment needed to meet the requirements of the country.

The construction plan for the electrical engineering and power machinery industries provides for an increase in boiler manufacturing capacity of from 250,000 sq. metres (the figure for January 1, 1933) to 625,000 sq. metres (the figure for January 1, 1938), or a 2.5-fold gain; an increase in the production of steam and hydraulic turbines of from 800,000 kw. to 2,800,000 kw., or a 3.5-fold

gain; an increase in the production of generators of from 1,440,000 kw. to 3,400,000 kw., or a 2.4-fold gain, and an increase of from 3,500,000 kw. to 7,000,000 kw. in the production of transformers (including partial operation of a new transformer plant).

In general machinery production it is planned to complete the creation of the *heavy machinery* production base—the Kramatorsk Machinery Plant, the Ural Machinery Plant, the Novosibirsk and Krassnoyarsk Mining Equipment Plants, the Vyksa Crushing and Grinding Equipment Plant, the Ural Chemical Apparatus Plant, and so on. The manufacture of hoisting equipment is being organized at the Verkhnye Saldinsk Structural Iron Plant, and so on. A powerful new plant producing machinery for the paper industry is also being built.

The plan of construction for the machinery industry lays particular stress on securing improved cultural and living conditions for the toilers. This end is to be achieved by greatly extending the machinery production base of light industry and the food industry and by directly increasing production capacities for the output of articles satisfying everyday needs (steam radiators, baths, telephones, etc.) and metal products for general consumption (electric household articles, radio equipment including tube sets, cameras, bicycles, kitchen utensils, etc.).

The plan contemplates that when these plants representing 7,000,000,000 rubles of additional fixed capital invested in the manufacture of machinery start operations, considerable reserve capacities will be created, especially in the principal items of production.

Owing to the carrying out of so vast a program of new construction, a marked increase in the concentration of the machinery industry will be achieved. This may be seen from the increase in the average volume of output per enterprise. According to the figures of the People's Commissariat of Heavy Industry, the average output per enterprise in the machinery industry is increasing in value from 10,000,000 rubles in 1932 to 20,000,000 rubles in 1937 (in fixed 1926-27 prices).

The greatly increased demand for repairs to equipment in operation caused by the rapidly increasing quantum of equipment, and the task of increasing the output under the control of People's Commissariats (besides the People's Commissariat of Heavy Industry) and State organizations to a value of 2,600,000,000 rubles in 1937, as against 1,500,000,000 rubles in

1932, call for the investment of considerable sums to enlarge the capacity of the repair shops. An almost entirely new chain of specialized automobile repair shops is under construction. The sum of 290,000,000 rubles has been appropriated for such repair factories and 190,000,000 rubles for repair shops, while 30,000,000 rubles have been allowed for the extension of plants producing garage equipment. The repair system of civil aviation is undergoing rapid development. Much building is planned for extending the existing rail and waterway transportation repair shops. Investments in locomotive and car repair plants and shops to be built anew or reconstructed will reach 1,000,000,000 rubles.

The agricultural machinery repair system is being considerably extended for which purpose about 730,000,000 rubles will be expended. The repair system will then comprise 18,000 machine-tools.

The proper geographic distribution of the specialized repair bases and the construction, in addition, of powerful regional repair plants which are to supplement the work of these bases and attend to the repairing and modernizing of disassembled equipment are acquiring tremendous importance in national economy.

* * *

The completion of the radical reconstruction of the existing machinery plants and the construction of the huge new machinery plants specified in the Second Five-Year Plan are giving rise to enormous production capacities. The mastery of the operation of these plants assures the leading role of the Soviet machinery industry in the completion of technical reconstruction in national economy as a whole.

ELECTRIFICATION

IN the field of electrification, the Seventeenth Congress of the Communist Party set the task of creating "a new *power base* for the completion of reconstruction in all branches of national economy."

The problems of electrification bearing on the completion of the technical reconstruction of industry are of paramount importance during the Second Five-Year Plan period.

During this period a complete change to electric drive must be effected in industry. Though a great deal was accomplished in this field during the First Five-Year Plan period, in many branches of industry, especially in light industry and the food industry, plants equipped with mechanical transmission still played a considerable role in the beginning of the second quinquennial period. By 1937, however, the electric motor must constitute the sole drive in the majority of industrial branches.

The mechanization of laborious industrial processes, especially the extraction of such raw materials as coal and ore and the smelting of metals, ensures a considerable increase in labour productivity by electrifying production equipment and intra-plant transportation.

Under the Second Five-Year Plan the most advanced production methods, based on the use of electricity for chemical or thermal purposes, are being applied on the widest scale. This is particularly true of the metallurgical, chemical and machinery industries. The consumption of electric current for these needs is increasing more than 9 times within the Five-Year Plan period.

The total electricity consumed by industry will amount to 26,400,000,000 kwh. in 1937 as against 8,700,000,000 kwh. in 1932. As a result of the considerable relative increase in processes of production consuming large amounts of electricity, of the displacement of the mechanical drive and the introduction of new, electrically operated machines, the consumption of electricity by industry during the Second Five-Year Plan period continues to rise at a rate in excess of that applying to the general growth of industrial output (while the latter increases by 114.1 per cent, the former rises 203 per cent during this period).

Electrification is solving many important problems arising

under the Second Five-Year Plan in the field of reconstructing transportation. Those sections of the Donetz Basin, Dnieper Area, Murmansk District and the Transcaucasian Railroad lines which show the greatest freight congestion, and the mountain pass sections of the Urals and Northern Caucasus will be supplied with electric traction by 1937. There will be a further considerable increase in the electrification of suburban passenger railroad service (Moscow, Leningrad, Kharkov, Mineralnye Vody). In addition there is a considerable gain in electric power consumption by the railway transportation system due to the development of repair shops, increased water supply, lighting of yard tracks, etc. The total consumption of electric power by the railroad transportation system is rising from 370,000,000 kwh. to 1,600,000,000 kwh.

The victory of large-scale socialist agriculture transforms the latter into a big electric power consumer. The electrification of the shops of the machine and tractor stations and of the State farms, the extensive use of the electric motor for threshing which proved its worth when subjected to a test on a mass scale in 1933, and the use of electric motors for preparing fodder, securing the water supply, etc., necessitate a 10 to 15-fold increase in the electric power supplied to agriculture for purposes of production during the Five-Year Plan period.

Finally, the further growth of the cities, the radical improvement in the welfare of the toilers and the increase in their cultural demands in town and country make it necessary to provide for a considerable augmentation of electric power consumption to meet the needs of municipal services, particularly lighting.

The total consumption of electric power in the whole of national economy[1] is set at 38,000,000,000 kwh. for 1937, as against 13,400,000,000 kwh. actually consumed in 1932.

Underlying the electrification program incorporated in the Second Five-Year Plan is the proposition that a power base adequate to meet all demands for electricity must be created in every district of the U.S.S.R., and the requisite reserve capacity must be set up.

The main technical and economic principles governing the establishment of the Soviet Union's electric power system—principles which lay at the root of the Plan elaborated by the State

[1] Allowing for transmission losses and for the power stations' own requirements.

Commission for the Electrification of Russia (*Goelro*)[1] and the First Five-Year Plan and are being consistently applied also under the Second Five-Year Plan—are the concentration of electric power generation in large regional stations,[2] the creation of regional super-power systems and the change to local sources of power in the supply of electric current.

The total capacity of all electric power stations in the Union must grow from 4,696,000 kw. in 1932 to 10,900,000 kw. in 1937. The major increase in capacity and output of electricity is to be accounted for by the regional stations.

Electric power stations	Installed capacity (thousand kw.)			Power generated (million kwh.)		
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
All electric power stations in the U.S.S.R.	4,696	10,900.0	232.1	13,390	38,000	283.8
of which:						
Regional stations	3,007.5	7,893.5	262.5	9,188	29,750	323.8
Regional stations in % of total	64.0	72.4	—	68.6	78.3	—

The concentration of electric power output at large regional stations is being further developed during the Second Five-Year Plan period.

While not a single electric power station in the Soviet Union had a capacity of 100,000 kw. or more at the beginning of the First Five-Year Plan period, there were 10 such stations in 1932 with an aggregate installed capacity of more than 1,500,000 kw. and an output of 4,500,000,000 kwh. In 1937 there will be 27 such stations representing an aggregate capacity of 4,516,500 kw. and an annual output of 17,600,000,000 kwh., *i.e.*, almost half (46.2 per cent) of the total electric current generated in the Soviet Union.

This rising proportion of large-scale central electric stations is accompanied by an increase in the share of the country's electric power equipment represented by the most powerful units. In

[1] The Plan provided for the construction, in the course of 10 to 15 years, of 30 large power stations with an aggregate capacity of 1,700,000 kw. in various parts of the country.

[2] This term is applied to large (not less than 24,000 kw.) public utility power stations supplying power to the enterprises of the respective regions. Big industrial power stations of region-wide importance such as the Magnitogorsk and Stalinsk stations and the Berezniki Central Heat-and-Power Station are included among the regional power stations.

1932 the aggregate capacity of units of 22,000 kw. and over in the electric power stations of the Soviet Union constituted 1,598,600 kw. (34 per cent of the total installed electric power station capacity). In 1937 the aggregate capacity of generators of 22,000 kw. and over will constitute 6,064,600 kw., *i.e.*, 55.6 per cent of the total capacity of the country's electric power equipment. As a rule the new stations are being equipped with 25,000 to 50,000 kw. units, and by the end of the Five-Year Plan period some 100,000 kw. units will have been installed.

The extensive application during the Second Five-Year Plan period of huge condenser units, powerful heat-and-power turbines (up to 50,000 kw. per unit), and high pressure steam, high superheat and water-wall boilers, the combustion of the most diversified forms of pulverized fuel, the introduction of automatic station control, parallel with the simple and expedient general combination of heat-and-power generation in one station, as well as the introduction of the largest hydro-electric turbines in the world will assign to Soviet power utilization, by the end of the Second Five-Year Plan period, one of the foremost places in the world in point of technique. The old stations remaining in operation during this period are undergoing more or less thorough reconstruction and are shifting to the use of local fuel. A considerable number of stations located within the compass of urban settlements are being re-equipped to act as central heat-and-power stations.

The interconnection of stations is being developed on a very large scale during the Second Five-Year Plan period. Huge super-power systems, established on a par with the biggest systems of Europe and America, are being set up in all the industrial districts of the Union.

In 1932 there were 3 central station networks in the U.S.S.R. possessing an aggregate annual output exceeding 1,000,000,000 kwh. In 1937 there will be 8 such networks in the U.S.S.R. representing an annual output of electricity aggregating 25,000,000,000 kwh., *i.e.*, two-thirds of the total electric power generated in the country. The interconnection of the high-voltage transmission lines of the Dnieper and Donetz Basin systems is establishing the greatest super-power system in the world with an output of 9,000,000,000 kwh. a year.

The interlinking of such high-voltage systems as that of Moscow, Ivanovo and Gorky, of the Northern and Southern Ural System with that of the Middle Urals, and of the Donetz Basin with

the Dnieper system denotes the transition to a new type of power system—the inter-regional system which represents a direct preparatory step toward the creation of a single high-voltage system that will unite all the principal industrial regions of the Soviet Union.

The consolidation and extension of power production of the principal industrial regions of the Union—Moscow, Leningrad, the Southern Coal and Metal Base and the Ural-Kuznetsk Combination—constitute the main feature in the construction program of electrification during the Second Five-Year Plan period.

The Moscow power network, the biggest in the Soviet Union at the beginning of the Second Five-Year Plan period, is undergoing considerable expansion during the course of this period. This is being accomplished by putting in operation the Stalinogorsk Central Station located in the Moscow Coal Basin and having a capacity of 400,000 kw.[1]; also 3 new huge central heat-and-power stations which are solving the problem of combined heat-and-power supply to the city of Moscow, *viz.*, the Central Heat-and-Power Station of the All-Union Institute of Heat Technology (60,000 kw.), the Stalin and the Frunze Central Heat-and-Power Stations representing capacities of 100,000 kw. and 150,000 kw., respectively. In addition the Moscow network will receive the output of the hydro-electric power stations now being erected on the Volga-Moscow Canal, representing a total capacity of 88,000 kw., as well as the output of the large power stations belonging to the Tula Iron and Steel Works. The new heat-and-power plants will burn Moscow coal, and in conjunction with the peat-burning stations in operation will assure the Moscow Region of an adequate supply of electricity generated almost entirely by the use of local fuel.

TYPES OF FUEL USED IN GENERATING ELECTRICITY FOR THE MOSCOW NETWORK

(million kwh.)

Types of fuel	1932	Percentage of total	1937	Percentage of total
Peat	988.1	40.6	1,300	25.0
Donetz coal	711.0	28.5	100	1.9
Moscow coal	232.0	9.5	3,300	63.4
Oil	524.1	21.4	300	5.7
Water power	—	—	210	4.0
Total	2,455.2	100.0	5,210.0	100.0

[1] This station also supplies heat to a chemical combination.

The ramified high-voltage network of the Moscow Regional Electric Power Board is supplemented by the Stalinogorsk-Moscow 220,000 volt main transmission line. This system when augmented will embrace almost the whole territory of the Moscow Region. The total electricity output of the electric power stations in the Moscow network is rising from 2,400,000,000 kwh. in 1932 to 5,200,000,000 kwh. in 1937, while the installed capacity is rising from 542,500 kw. in 1932 to 1,410,300 kw. in 1937 and the maximum load on the bus-bars of the Moscow network power stations is mounting to more than 1,200,000 kw. in 1937. Thus the Moscow network is acquiring the necessary reserve capacity. Simultaneously with the growth of its electric power capacity Moscow is being transformed into the greatest centre of heat-and-power development not only in the U.S.S.R. but in the whole world. Heat-and-power distribution in Moscow will radiate from 7 regional stations. The length of this network's steam lines will be 90 km. and up to 2,500,000 mega calories of heat will be supplied to the consumers.

The increase in capacity and power generation of the Moscow network assures the further rapid growth of Moscow's industry, particularly the growth of the chemical, the machinery and light industry. It will make possible a great increase in the consumption of electric power for municipal services (the subway, street cars, water supply) with the big State and collective farms included in the list of enterprises served by the regional stations, while the quantity of long-haul coal and oil used at the electric power stations will be greatly diminished.

Leningrad's electric power supply was firmly established at the beginning of the Second Five-Year Plan period when the Dubrovo State Regional Station (capacity 100,000 kw.) burning peat and especially the Lower Svir Hydro-Electric Station with a capacity of 96,000 kw. were put in operation. Provision is made to meet the demand for electric power, which is further increasing during the Second Five-Year Plan period owing to the growth of Leningrad's industries, particularly of such great consumers of electricity as the aluminium industry. This rise in the output of electric power is achieved by enlarging the Dubrovo State Regional Station to give it a capacity of 150,000 kw., by erecting the Moscow-Narva high-pressure Central Heat-and-Power Station (100,000 kw.) and the Upper Svir Hydro-Electric Station (capacity 144,000 kw.). Leningrad will be supplied with heat from the Moscow-Narva Central Heat-and-Power Station; besides, the 3 city

electric power stations will be equipped for central heat-and-power distribution. The aggregate capacity of the power stations in the Leningrad network is rising from 323,400 kw. in 1932 to 742,400 kw. in 1937, while the power generated is increasing from 1,500,000,000 kwh. to 2,800,000,000 kwh. in 1937.

At the end of the Second Five-Year Plan period Leningrad's electric power supply, which must be based on 3 big hydro-electric stations and 2 big peat-burning stations, will be fully assured and will have become largely independent of fuel brought in from other districts.

ELECTRICITY GENERATED IN THE LENINGRAD NETWORK CLASSIFIED ACCORDING TO SOURCE OF POWER

(million kwh.).

Source of power	1932	Percentage of total	1937	Percentage of total
Coal	630.1	41.5	640	23.2
Peat	441.2	28.9	1,230	45.0
Water power	451.4	29.6	870	31.8
Total	1,522.7	100.0	2,740	100.0

The electric power base of the *Ivanovo Region* and the *Gorky industrial centre* is being developed by enlarging the capacity of the peat-burning regional stations—the Ivanovo Station (enlarged to 123,000 kw.) and the Gorky Station (enlarged to 204,000 kw.), by erecting a huge new peat-burning central heat-and-power station attached to the Yaroslavl Rubber Combination (50,000 kw.), and by interconnecting all big power stations of these districts. Besides, the Plan contemplates the erection of 2 big central heat-and-power stations at junction points where there is a concentrated demand for heat for industrial purposes: in the Sormovo-Kanavino District with its machinery and light industry and the Dzerzhinsky District with its chemical works and oil refining combinations. These central heat-and-power plants, which centralize the supply of heat to industry, will considerably reduce the quantity of oil now burned in the boiler rooms of these districts. In order that the electric power supply of the entire network, which consists almost exclusively of peat-burning stations, may be more stable, the Sormovo-Kanavino Central Heat-and-Power Station is planned to consume Donetz fuel.

If the electric power base of these districts is to be consolidated, it is absolutely necessary to secure a decided improvement in the

system of peat extraction (supply of stations with peat of normal humidity) and store up peat reserves at the central stations, improve the transportation facilities, and extend the peat base of the Gorky State Regional Station by exploiting the bog in the eastern section of the Ivanovo Region.

The consolidation of the electric power base of the Ivanovo Region will make it possible to extend the regional station network, to include in the system the numerous textile mills of the region which at present obtain their power from their own obsolete electric light and power installations, and will enable the textile mills now operated by mechanical drive to be electrified.

In order that the power base of the industrial districts of Ivanovo and Gorky may be still further consolidated, huge hydro-electric stations are being erected on the Volga—the Yaroslavl Station (capacity 100,000 kw.) and the Gorky Station (capacity 200,000 kw.).

Huge building operations are under way at the sites of these hydro-electric stations during the Second Five-Year Plan period, which ensure the completion of the construction of the Yaroslavl and Gorky Stations during the Third Five-Year Plan period. These stations, which will generate power for the unified network of the central industrial district, including Moscow, will render the gigantic electric power system of Moscow, Ivanovo and Gorky more reliable and more flexible.

The task of supplying electric power to the *first coal and metal base* is being solved in the first place by mastering capacity operation of the plants set up during the First Five-Year Plan period. The amount of electricity required by the Donetz Basin (the united super-power system of the Donetz Basin and of the adjoining sections of the Azov-Black Sea Territory) is assured in the main until 1936 by raising the capacity of the Zuyevka State Regional Station to the planned 250,000 kw., by mastering the operation of the Shterovka Station and the Donsoda Central Heat-and-Power Station at their respective capacities of 152,000 kw. and 65,000 kw., by completing the Artem State Regional Station (95,000 kw.) and by putting the huge power stations at the metallurgical and chemical plants into operation. After 1936 the capacity of the electric power stations in the Donetz Basin must be further enlarged.

The proper organization of the line network of the whole power system constitutes an important chapter in the program of elec-

trification of the Donetz Basin during the Second Five-Year Plan period. The high-voltage Donetz Basin networks were set up gradually, commensurate with the growth of industry and of the electric stations, and completely fail to keep up with the present-day level of power requirements.

The networks must be radically reconstructed according to a single rational scheme, and must be properly safeguarded against a recurrence of the numerous breakdowns in the past.

In order to provide for a further increase in the load to be carried by the electric system in the eastern section of the Donetz Basin and the adjoining industrial districts of the Azov-Black Sea Territory, as well as to provide for the electric power supply of the Likhaya-Stalingrad Railroad which is being electrified in that section of the Donetz Basin, a large central station with a capacity of 100,000 kw. is being erected to burn the dust coal of the Nyesvyetai anthracite district.

The Dnieper Area is developing into a gigantic agglomeration of electro-metallurgical and metallurgical plants, of electrified transportation and farming. The capacity of the Dnieper Hydro-Electric Station is being raised to 558,000 kw. and its projected average annual output of 2,900,000,000 kwh. is being mastered.

To serve as steam power reserve for the Dnieper Hydro-Electric Station, a State regional station is being constructed at the Dzerzhinsky Iron and Steel Plant with a capacity of 96,000 kw. in addition to a central heat-and-power station at the Krivoy Rog Iron and Steel Plant. In case of necessity central heat-and-power stations will be built at the Dnieper Combination and the Nikopol Pipe Factory. However, the capacity of these steam stations will be insufficient to meet the demands made on the Dnieper network in autumn and winter, when the Dnieper Hydro-Electric Station has a diminished capacity.

ELECTRIC POWER SYSTEM OF THE SOUTHERN COAL AND METAL BASE

Regions	Capacity in thousand kw.		Output in million kwh.	
	1932	1937	1932	1937
Donetz Basin	614	1,004	1,790	4,200
North Caucasian section of Donetz Basin (including Rostov-on-Don)	105	222	295	730
Dnieper Area	414	788	510	3,600
Entire system	—	2,014	—	8,530

In order to carry the Donetz Basin and Dnieper network loads, there has been included in the Plan the erection of a new big central station in the western section of the Donetz Basin to compensate for the seasonal lower capacity of the Dnieper Hydro-Electric Station. This station will burn the waste from coal-mining and dressing operations. The capacity of the station will reach 200,000 kw. in 1937, and its Donetz Basin-Dnieper high-voltage transmission line will supply electric power to the Dnieper Area. On the other hand, the summer surplus capacity on the Dnieper will enable the steam stations of the Donetz Basin and the Dnieper Area to close down for overhauling and repairs. In this connection the high-voltage Donetz Basin-Dnieper line will generate not only for reserve and load transfer but will serve as a means of long-distance power transmission from the Donetz Basin to the Dnieper Area, thus relieving the railroads of the necessity of hauling coal for the Dnieper Area electric stations. As the load for the Dnieper Area increases during the Second Five-Year Plan period, it becomes necessary to work out variants for the supplemental power supply of the Dnieper Area after the close of this period. This can be done by using lignite (Alexandria); also by regulating the flow of the Dnieper by building dams in its upper reaches, etc.

Through uniting the Donetz Basin and Dnieper power networks and coupling to this system that of the coal and metal district of the Azov-Black Sea Territory (Rostov-Shakhty) there arises a gigantic power system which in 1937 will represent a total capacity of 2,000,000 kw. and a potential output of 9,000,000,000 kwh. (The Niagara-Hudson Corporation, which at present produces more electricity than any other concern in the world, generated 6,600,000,000 kwh. in 1930.)

An immense electric power construction program has been mapped out for the *Urals* during the Second Five-Year Plan period. Here it was very difficult for the supply of electricity to keep pace with the demand at the close of the First Five-Year Plan period as a result of the soaring tempo of industrial construction which was outstripping the development of power economy.

Just as at the end of the First Five-Year Plan period the electric power supply of the first coal and metal base of the Union was decidedly reinforced, so during the Second Five-Year Plan period an electric power supply base sufficiently powerful to meet the swiftly rising demand of Ural industry must be created. The main electric power construction sites are located at the power

sources of the Ural District—the Kizel and Chelyabinsk coal-fields. The capacity of the Kizel State Regional Station is being raised to 100,000 kw.; the ability to operate the central heat-and-power station of the Berezniki Chemical Combination at capacity (83,000 kw.) is being acquired. These stations supply electric current not only to the Perm and Gubakha industrial districts but also to the Middle Urals over the Chussovaya-Nizhni Tagil transmission line. In the Southern Urals, an area consuming large quantities of electricity because of the tremendous growth of its iron and steel industry and the manufacture of ferro-alloys, aluminium and machinery, the capacity of the Chelyabinsk State Regional Station is being raised to 150,000 kw. and a new station with a 100,000 kw. capacity is being erected in the Chelyabinsk District. In the Sinarsk District a big central heat-and-power station is being built at the aluminium combination. Its capacity is scheduled to be 125,000 kw., and it also is to burn Chelyabinsk coal. In the extreme south of the Urals the capacity of the Magnitogorsk Central Station is being enlarged to 198,000 kw. The electric power supply of the Sverdlovsk District, which is itself short of fuel, is assured by the transmission of some of the power generated at the Kizel and the Chelyabinsk power bases, by the production of power at the central heat-and-power stations of the Middle Ural factories (the central heat-and-power stations of the car-building combination, of the Tagil Iron and Steel Plant and of the Ural Machinery Plant) as well as at the Middle Ural State Regional Station built at the peat bogs of the Isset District (near Sverdlovsk).[1]

All the power networks of the Urals, from Berezniki to Magnitogorsk, are being united in a single high-voltage transmission system. The total capacity of all Ural stations is increasing from 469,000 kw. in 1932 to 1,300,000 kw. in 1937 while their output is mounting from 1,000,000,000 kwh. to 5,000,000,000 kwh. In the Third Five-Year Plan period the big Perm Hydro-Electric Station (310,000 kw.) which will transmit power to the Middle Urals will be added to the Ural power system.

In addition to these principal power systems, large power networks are being established during the Second Five-Year Plan period in all the industrial districts of the U.S.S.R.

The *Kuznetsk* coal and iron district will be supplied with power

[1] For the first few years the station will burn Chelyabinsk coal.

from two great interconnected central heat-and-power stations—the Kemerovo Station (148,000 kw. capacity) and the Kuznetsk Station (108,000 kw. capacity), whose network will cover the entire industry of the district. In Karaganda, a State regional station having a capacity of 48,000 kw. is under construction.

In *Transcaucasia,* 3 big groups of electric stations are being formed: the Georgian, the Armenian and the Baku groups. In Georgia the main task confronting power plant construction consists in putting into operation the plants needed to supply the load of the group during the low capacity season of the group's hydro-electric stations: the Rion Station, the Transcaucasian Hydro-Electric Station and the Ajaris-Tskhali Station. This is being accomplished by erecting a regulating steam power station burning the waste from dressed Tkvarcheli coal and by setting up a high-head hydro-electric station on the Khram River. The latter station will be equipped with a big water reservoir that will make it possible to balance the load on all the stations of the network, seasonally and over long periods of time. In Armenia the first big station of the Sevan-Zange Cascade—the Kanakir Station with a capacity of 88,000 kw.—is being erected and construction operations for the biggest station of this cascade—the Giumush Station with a capacity of 145,000 kw.—are under way. Thus in the Second Five-Year Plan period, a considerable proportion of the stupendous plan of completely utilizing the vast natural reservoir offered by Lake Sevan for power and irrigation purposes is already being realized. In Azerbaijan the Baku heat-and-power stations are being developed, their capacity being raised to 276,000 kw. and on the Terter River a large hydro-electric station is under construction.

LARGE POWER SYSTEMS IN TRANSCAUCASIA

Power station groups	Capacity in thousand kw.			Output in million kwh.		
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
Georgian group . . .	14.1	220.7	1,565	88.3	618	700
Armenian group . . .	16.6	121.7	733	40.6	543	1,337
Baku group	157.7	276.0	135	606.3	1,300	214
Total	188.4	618.4	328	735.2	2,461	335
of which: Water power . .	33.5	336.4	1,004	135.6	1,041	768

The hydro-electric power supply in Transcaucasia serves as the basis on which electro-metallurgical and electro-chemical works are being set up, as in Zestafon, where 60,000 tons of ferro-manganese will be produced annually, and in Erivan and Karaklis, where calcium carbide and synthetic rubber will be produced. The total output of electric power in Transcaucasia is increasing from 789,000,000 kwh. to 2,750,000,000 kwh., of which hydro-electric power constitutes over 1,000,000,000 kwh.

In the *Northern Caucasus* a large system is being set up in the Orjonikidze-Grozny District. It unites the Gizeldon and Achaluki Hydro-Electric Stations with the Grozny Steam Power Plant. The electric power supply for the industrial cities of the *Volga Area* (Stalingrad, Saratov, Samara, Kazan) is increasing considerably as a result of the enlargement of the stations erected under the First Five-Year Plan, and the adoption of oil shale as fuel by some of these stations. The old stations are being enlarged and new ones built in the industrial centres of the Ukraine (Kiev, Odessa) and White Russia (Minsk and Ossinovka). In the *Voronezh* Region where large power resources are lacking a powerful system is being created on the basis of exploiting combustible gases from the Lipetsk Iron and Steel Combination: the central heat-and-power station of the Lipetsk Plant is being connected with the Voronezh Central Heat-and-Power Station, which supplies heat to a synthetic rubber factory and to an oil-refining combination. A large power system is being established in Orsk to serve both the locomotive and oil-refining plants.

In the Second Five-Year Plan period *Central Asia* will exhibit a sharp increase in the power capacity of its electric stations. In 1937 a huge water-power station will go into operation—the first section of the Chirchik Plant (170,000 kw.) which will supply the power basis for a synthetic ammonia factory, the second section of the Chirchik Plant starting in 1938. Heat-and-Power stations are being erected in the industrial areas of Central Asia—the districts of Ferghana and Melnikovo, and the cities of Ashkhabad and Tashkent (in Tashkent, the central heat-and-power station of the textile combination). Capacity production is being mastered at the Kadyrya Hydro-Electric Station and new medium-sized hydro-electric stations are being put into operation in Tashkent and in Stalinabad on the Varzob River.

Special attention is to be paid under the Second Five-Year Plan to the development of the electric power supply for *East Siberia* and the *Far East*. In the Vladivostok District a large station

(24,000 kw.) burning Artem coal is to be built, connecting with the city stations of Vladivostok. In Khabarovsk a regional station will be built with a capacity of 24,000 kw. to supplement the city station of 6,000 kw. built at the beginning of the Second Five-Year Plan period. In order to supply the machinery industry and the municipal services of Irkutsk, and the Cheremkhovo Coal Basin, a regional station burning Cheremkhovo coal is being built in the Irkutsk District.

Thus, alongside of the further development of the power bases for the already existing industrial regions, a number of large networks are being established in the new industrial regions of the Union. Special impetus is being given to the development of power production in the national republics of Central Asia, Transcaucasia, Karelia, and elsewhere.

As early as the First Five-Year Plan period the extensive utilization of local fuel by the regional stations played an important part in solving the problem of supplying power to the main industrial regions far removed from fuel bases. Thus the dependence of these districts upon long-haul fuel was considerably lessened. To lighten the work of the railroad transportation system and effect economies in the use of high-grade fuels, the Second Five-Year Plan specifies maximum exploitation of local power resources.

The program for the Second Five-Year Plan period contemplates increasing the proportion of local fuel in the fuel balance of the power stations, while sharply raising the percentage of water power. Special stress is laid on the extensive utilization of local coal, waste products of coal mining and coal processing (dust coal, waste products of coal dressing). The very extensive application of pulverized fuel in central stations makes possible the economic exploitation of fuels of the very lowest heat content (oil shale in the Volga Area, coal-dressing waste products in the Donetz Basin and Tkvarcheli, coking waste products, etc.). The proportion of long-haul coal will considerably decrease; burning oil under the boilers of central stations will be reduced to a minimum by re-adapting the majority of stations now operating on oil to the use of hard fuel, or by employing them only for peak loads.

The various sources of power entering into the fuel balance of the regional power stations are undergoing the following proportional changes during the Second Five-Year Plan period:

	1932	1937
	(in % of total)	
Long-haul fuel	33.8	21.0
of which:		
Oil	19.6	4.06
Local fuel	58.9	59.5
of which:		
Coal and coal-mining waste products	31.7	38.7
Water power	7.3	19.5

The projected increase in the output of electric power by hydro-electric stations from 700,000,000 kwh. in 1932 to 5,800,000,000 kwh. in 1937 is being achieved primarily by mastering the capacity output of the Dnieper Hydro-Electric Station and by putting in operation the new large hydro-electric stations in the Transcaucasus (the Rion Station, the second section of the Transcaucasian Hydro-Electric Station); also the station on the Khram River, the Kanakir Station, the hydro-electric stations on the Svir (Nos. 2 and 3), the stations on the Tuloma River (Murmansk District), in the Khibinogorsk District, in the Northern Caucasus (Baksan, Gizeldon, Achaluki), in the Altai District (Ulba) and in Central Asia (Chirchik, Kadyrya). After the necessary prospecting and surveying, the construction of a hydro-electric station will be commenced at one of the junctions of the White Sea-Baltic Canal—at Matkozhenskaya or some other point—which will supply power to an aluminium combination. While erecting the Dnieper Station the Soviet Union acquired vast experience in hydro-electrical construction. The experience gained in building Svir Station No. 3 under difficult geological conditions, in building the high-head stations of Transcaucasia and the White Sea-Baltic Canal makes it possible to map out during the Second Five-Year Plan period the early realization of the biggest hydro-electrical engineering projects in the shortest period of time—the erection of the Upper Svir Hydro-Electric Station, the construction of a powerful hydro-electric station on the Tuloma River, the northernmost station in the world, and of the Middle Volga station on difficult soil, as well as of the high-head stations at the Sevan-Zange Cascades and on the Khram River, which are to be completed at an early date. Total power capacity of the regional hydro-electric stations is increasing from 396,300 kw. in 1932 to 1,344,400 kw. in 1937. The average cost of producing one kilowatt-hour at hydro-electric power stations—one kopek—makes it possible to use this power extensively in the manufacturing of commodi-

ties which it requires a large amount of electric power to produce, such as synthetic rubber, synthetic ammonia, aluminium, ferro-alloys, electrolytic zinc, also electrolysis of water, etc.

Heat-and-power development is making great progress under the Second Five-Year Plan. As a rule, new steam plants are being built with a view to securing a heat supply for industry and urban centres. Thus, on the completion of the Stalinogorsk State Regional Station, all further increases in the consumption of electric power by the Moscow Region will be met by the construction of central heat-and-power stations. In Leningrad the power capacity of the Dubrovo State Regional Condensing Station is limited to 150,000 kw., and a further increase in steam plant capacity will be obtained by constructing central heat-and-power stations (Moscow-Narva and Okhta Central Heat-and-Power Stations). In the Urals an increase in capacity after completion of the Kizel, Middle Ural and Chelyabinsk Condensing Stations will be secured by the construction of large central heat-and-power stations at industrial enterprises (an aluminium combination, a railroad-car combination, metallurgical and machinery plants).

Electric power stations built at factories are taking on the form of central heat-and-power stations almost exclusively. In addition to the large heat-and-power plants at metallurgical, chemical and machinery plants, a large number of small stations of this description are under construction at enterprises of both light industry and the food industry.

The Second Five-Year Plan period should in consequence show a marked rise in the proportion of heat-and-power development in the total electric power capacity of the Union.

Indices	1932	Capacity added (1933-37)	1937
	(Capacity in thousand kw.)		
Hydro-electric stations (total) . . .	450	1,154.0	1,604.0
Steam power stations	4,246	5,221.6	9,296.0
of which:			
Heat-and-power stations	505	2,264.5	2,769.5
Heat-and-power station capacity in % of total steam power capacity .	11.9	43.3	29.8

In this way regional heat-and-power stations constitute 43.3 per cent of the steam-power capacity added in the Second Five-Year Plan period.

The total capacity of central heat-and-power stations is increasing from 505,000 kw. in 1932 to 2,769,500 kw. in 1937, including the capacity of regional steam stations which is increasing from 214,200 kw. to 1,903,200 kw.

Inasmuch as heat-and-power installations yield the highest heat economy when high pressure is used, a number of steam central stations operating under high pressure (60-100-130 atmospheres) will be built during the Second Five-Year Plan period. These include: the central heat-and-power station of the All-Union Institute of Heat Technology, the Moscow-Narva, the Sormovo-Kanavino and the Frunze Station, etc. The total capacity of high pressure plants will reach 560,000 kw. in 1937. In these central heating plants heat-and-power turbines of large capacity (25-50,000 kw.) of Soviet construction will be installed. The capacity of a number of central heat-and-power stations will reach 100-150,000 kw. in the Second Five-Year Plan period. In all the new large enterprises requiring great quantities of heat at low potentials for their technological processes (especially in the chemical industry), central heat-and-power plants are being constructed supplying steam to these enterprises and returning cheap electric power to the general network. In 1937 the total output of heat energy will reach about 20,000,000 mega calories. The heat energy main lines of the regional stations will reach 480 km. in 1937 as against 57.9 km. in 1932.

The U.S.S.R. is far outdistancing the capitalist countries in its level of heat-and-power development.

The problems arising in the sphere of interconnecting central stations and of centralizing the electric power supply must be solved by greatly expanding the high-tension networks. The length of high-tension transmission lines will be 26,000 km. by the end of the Second Five-Year Plan period, as against 9,800 km. in 1933. The program of network expansion includes 38,000 and 110,000 volt transmission lines in addition to a number of transmission lines carrying 220,000 volts (Stalinogorsk-Moscow, Svir-Leningrad,[1] Donetz Basin-Dnieper and a main line uniting the Northern and Southern Urals).

Parallel with construction of new high-voltage networks in the Second Five-Year Plan period, a great deal of work will have to be done to reconstruct the urban cable networks. This becomes

[1] One section began operations in 1933.

necessary because a number of cities are being connected with regional station networks.

Expansion of Regional Station Networks

Voltage (in kilovolts)	Length (in km.)	
	1932	1937
220	—	1,636
160	220	484
110	4,330	12,430
38	4,030	10,500
22	1,240	1,200
Total	9,820	26,250

The building program mapped out by the Second Five-Year Plan, as far as it concerns the main section of electric power construction—the regional stations under the Chief Power Board of the People's Commissariat of Heavy Industry—comprises 79 power construction projects having a total capacity of 5,480,000 kw.; 45 of these projects representing a total capacity of 2,500,000 kw. were already under construction in 1933. For the purpose of realizing this program of construction and reconstruction of central stations and networks, 5,350,000,000 rubles are being invested in stations and networks under the Chief Power Board, as against 1,900,000,000 rubles under the First Five-Year Plan. The major portion of this sum (3,695,000,000 rubles) will be expended on the construction of power stations, which will ensure an addition of 4,100,000 kw. to the regional stations under the Chief Power Board during the Second Five-Year Plan period. Besides this, considerable sums have been appropriated for the commencement of construction on those hydro-electric and steam stations that will go into operation during the Third Five-Year Plan period.

A large portion of the capital investments made during the Second Five-Year Plan period is required by stations already in operation. Some stations which were started in the first quinquennial period began work when many details were still unfinished, in consequence of which the working capacity of the stations was lowered. Defects in the water supply, fuel preparation, air blast and ash removal lower the quantity of steam produced in the boiler rooms. At a number of stations the installed boiler capacity lags behind the installed turbine capacity. During the years of the Second Five-Year Plan period it is absolutely necessary to abolish the disproportions in power equipment; it is indispensable that the exploitation of the installed capacity of the

station be assured and likewise that the old stations still in operation in the Second Five-Year Plan period be modernized and reconstructed.

Much of the electrical construction program applies to investments in the Middle Volga stations. The total appropriation for these stations—855,000,000 rubles—includes 80,000,000 rubles for dams and water-power stations above Yaroslavl (Myshkin-Kalyazin) which are necessary to create an unbroken deep waterway from Moscow to the Mariinsk canal system.

The People's Commissariat of Waterway Transportation which is building the locks is also participating in the construction of the Middle Volga stations jointly with the People's Commissariat of Heavy Industry.

In conformity with the requirements of these construction problems, the Second Five-Year Plan contemplates the investment of 5,350,000,000 rubles in stations and networks under the Chief Power Board of the People's Commissariat of Heavy Industry. This sum is being allocated as follows:

Stations	3,695,000,000	rubles
of which:		
Hydro-electric stations	1,797,000,000	"
Electric networks	842,000,000	"
Heating pipe-lines	90,000,000	"
Repair, reconstruction and other work on stations now in operation	510,000,000	"
Exploration and surveying	125,000,000	"
Scientific research	25,000,000	"
Miscellaneous	63,000,000	"

The key task in the field of electrification during the Second Five-Year Plan period is the *mastery* of capacity operation of the plants set up during the First Five-Year Plan period, the mastery in the shortest possible time of capacity operation of the large newly installed plants and the uninterrupted power supply to all branches of national economy. Interruptions in fuel supply, unfinished jobs at the stations and insufficient mastery of the technique of exploiting the big generator units, coupled with the lack of reserve capacities in the various electric systems gave rise, at the end of the First and the beginning of the Second Five-Year Plan periods, to various serious defects in the work of the stations: numerous breakdowns, insufficient capacity, etc., which led to major disturbances in the supply of electricity and to prolonged stoppages in industrial production. During the Second Five-Year

Plan period it is the duty of the power stations, upon the successful work of which the fulfilment of the Second Five-Year Plan depends, to ensure a reliable and uninterrupted supply of electricity by the rational technical exploitation of the plants. To achieve this normal exploitation, the Second Five-Year Plan makes provision for the creation, in all big power regions, of the necessary reserve capacities which are to ensure maximum capacity under normal conditions, and for the prompt performance of all necessary planned and preventive repairs and inspections of the machine units. Improved organization of work at the fuel bases, particularly the peat base, abolition of the disproportion in equipment, mastery of the technical exploitation of the electric stations and of the networks by their personnel, particularly mastery of the technique of exploiting the complex power systems (dispatcher service) are the necessary preconditions of uninterrupted power supply during the Second Five-Year Plan period.

Soviet electrical installations are assured of high use factors by planning the development of power utilization in direct connection with that of all other branches of national economy, by the intensive work of industry, the expansion of electro-chemical and electro-metallurgical manufactures and the wide development of interconnecting super-power systems.

The rise in use factors is effected by considerably increasing the utilization of the Donetz Basin and Dnieper Area stations which were insufficiently loaded in 1932; furthermore, by the utilization of those stations, the capacity of which was inadequately exploited as a result of fuel shortage or of jobs being left unfinished. The intensity with which stations are utilized in those large regions where utilization was sufficiently high even in 1932 (Moscow and Leningrad) is being stabilized and even reduced somewhat in 1937.

Annual Use Factor of Large Networks (in hrs.)

	1932	1937
Moscow	4,450	4,450
Leningrad	4,620	4,360
Ivanovo Region	2,180	4,250
Dnieper Area	1,450	4,410
Urals	3,640	4,740
Average for regional stations	3,460	4,200
All stations	2,100	3,800

The use factor mapped out by the Plan is not the maximum and can be raised in case of necessity. Even during the First Five-

Year Plan period the U.S.S.R. outdistanced the majority of capitalist countries with respect to use factors (in 1929: 3,047 hours for the U.S.A. and 2,187 hours for Germany). By its accomplishments in this respect during the present Five-Year Plan period it is bringing still more to the fore the superiority of planned, socialist economy.

The country's total annual output of electricity is rising to 38,000,000,000 kwh. (and to 24,500,000,000 kwh. at the regional stations under the Chief Power Board). The U.S.S.R. is surpassing all European countries and is capturing second place in the world in scale of power output (Germany's maximum output of power was 30,700,000,000 kwh.).

The increase in the capacity of units in steam stations, the mastery of the technique of their exploitation and the vast application of heat-and-power development and hydro-electric power make possible a substantial improvement in the qualitative indices of the electric power stations. The fuel expenditure per kilowatt-hour at the bus-bar is being reduced from 0.84 kg. of conventional fuel (the 1932 figure) to 0.66 kg. in 1937, *i.e.*, a reduction of 21.4 per cent. The cost of power production is dropping from 5.99 kopeks to 4.25 kopeks per kwh., or a 29 per cent reduction. To a certain extent, this is to be attributed to the proportionately greater use of cheap hydro-electric power in the total power generated.

Under the Second Five-Year Plan the electric power supply problem of the national economy of the U.S.S.R. is being solved in the main by the large regional stations[1] which produce 29,750,000,000 kwh. of the total of 38,000,000,000 kwh. generated. In the principal industrial districts (Moscow, Leningrad, Ural-Kuznetsk Basin, the Southern coal and iron district, Ivanovo and Gorky) all branches of economy receive their electric power supply almost exclusively from the ramified networks of the regional stations. In addition, the industrial, municipal and agricultural stations are playing a substantial part in supplying the remaining industrial districts, individual enterprises, cities and agriculture with electricity.

The reconstruction of industry's power utilization specified by the Second Five-Year Plan is being accomplished in the main by

[1] Besides the regional stations under the Chief Power Board, a number of factory electric stations are here included because they possess region-wide importance.

pursuing the line of linking up mills and factories with the network of the corresponding regional station. This makes it possible to discontinue operations at a great number of small stations which possess obsolete equipment and burn high-grade fuel. The total capacity of factory and mill power plants dismantled during the present five-year period will reach 100,000 kw. None the less, a great number of factory power plants are scheduled to be built during the Second Five-Year Plan period in addition to the construction of the big regional stations. These factory power plants are being constructed in the following instances: a) when it is impossible to supply the enterprise with power from the regional station because of the great distance involved; b) when the enterprise yields considerable combustible waste products (blast furnace gas in the metallurgical industry); and finally, c) when the enterprise is a great consumer of heat energy. The aggregate capacity of all industrial stations is growing from 1,319,400 kw. to 2,026,500 kw. This figure does not include the biggest industrial stations of region-wide importance (the Magnitogorsk, Kuznetsk, Baku and other stations).

During the Second Five-Year Plan period the central heat-and-power station which utilizes the power-yielding waste products of the enterprise and delivers its current to a general system or supplies power to adjacent industrial enterprises and settlements is becoming the predominant type of factory power plant.

The capacity of the municipal stations is undergoing considerable increase. Most of these stations are of great economic importance inasmuch as they supply power not only to municipal services but also to industrial enterprises, including a number of huge enterprises of Union-wide importance. The part played by the municipal stations in supplying electricity to the food industry and light industry, as well as to local industry manufacturing articles of general consumption, is assuming particular importance. A number of stations which have been set up by municipalities are really minor district stations with capacities up to 18,000 kw. The role of the municipal stations in the electric power supply of the Far East and of East Siberia is of special importance. The capacity of municipal central stations is rising from 254,900 kw. to 600,000 kw. in 1937, while the output is growing from 709,000,000 kwh. to 1,600,000,000 kwh. Municipal central stations cover only a minor fraction of the electric power required for municipal services and domestic needs. The amount of electricity consumed

by municipal services, lighting, heating apparatus, etc., is rising from 2,500,000,000 kwh. in 1932 to 4,600,000,000 kwh. in 1937. The major portion of electric power required for municipal services is supplied by the regional stations. In addition to the considerable increase in the power consumed by the largest urban centres (particularly Moscow, whose power consumption for purposes of municipal services is growing from 550,000,000 kwh. to 1,100,000,000 kwh. due to the operation of the subway, the extension of the water-supply system, etc.), the power consumption of medium-sized and small towns for purposes of muncipal services is likewise increasing by reason of the vast extension of such public services as electric lighting, water supply, street cars and sewage systems.

The capacity of the small agricultural stations is rising during the Five-Year Plan period to 180,000 kw. as against the former 53,000 kw. Yet only 33 per cent of the electric power consumed by agriculture is received from small agricultural stations, while 67 per cent of the power consumed is accounted for by the regional networks and local public utility stations.

ELECTRICITY SUPPLIED TO AGRICULTURE DURING SECOND FIVE-YEAR PLAN PERIOD

Classification	Capacity (thousand kw.)			Power (million kwh.)		
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
Electric stations	53.0	180.0	339.6	74.0	300.0	405
Agricultural public utility substations	12.9	270.0	2,093.0	21.0	700.0	3,330
Total	65.9	450.0	683.0	95.0	1,000.0	1,050

The agricultural electric stations must make maximum use of the combustible waste of agricultural production (gas-generating units). They must utilize the energy of the wind and to this end the manufacture of standard wind motors must be developed. Finally, the Second Five-Year Plan period must bring about the intensive construction of small hydro-electric stations designed according to standard types. These stations are to have simplified equipment and are to make use of facilities already created (water-mill dams, sluiceway heads of irrigation canals).

The application of electricity to agriculture must proceed largely in the direction of electrifying those production processes

of agriculture that require stationary motors. If electric motors are used in these cases, the tractors are freed from belt drive application for which they are unsuited, and thus the consumption of valuable fuel is reduced. The use of electricity in threshing has produced especially satisfactory results, as the experience of 1933 has shown. Electric threshing accelerates the threshing process, reduces its cost, cuts down losses and saves fuel. Electric threshing during the Second Five-Year Plan period must be installed wherever electricity can be procured without large expenditures for generating capacity and distributing network. It is planned to raise the number of electrified threshing points from 551 in 1932 to 15,000 in 1937.

Under the Second Five-Year Plan electric ploughing will not yet be of great economic importance. However, the experiments in electric ploughing now being conducted permit of its application in individual districts where conditions of electric power supply are particularly favourable and where especially deep ploughing is required (the grape-growing State farms of Armenia, the districts served by the Dnieper Hydro-Electric Station, etc.). According to the Plan, electricity will be used much more extensively in stock-raising—to light cattle sheds, prepare fodder, supply water, etc.

In order that hereafter electricity may find more extensive application in agriculture, it is necessary to set up a number of experimental districts for electrified agricultural production in the Second Five-Year Plan period. Such districts are being formed in the Moscow and Ivanovo Regions, in the Urals, in the Crimean Anapa District, in the Northern Caucasus and in the Dnieper District.

In these experimental districts electrification of agricultural production must be introduced throughout to test and select the most efficient methods by which in the future the greatest possible use can be made of electricity in agriculture.

Finally, the spread of electric lighting in rural districts is of exceptional political and cultural importance. Electric lighting supplies the well-to-do collective farmers with one of the most important means of cultural progress. The initiative of the collective farmers will undoubtedly play a decisive role in the introduction of electricity in agriculture.

The Second Five-Year Plan maps out a gigantic program in the field of electrification; within the course of five years 6,380,000

kw. must be made available for exploitation. This is three and a half times as much as the Plan of the State Commission for the Electrification of Russia specified for a period of 10 to 15 years. The generation of electric power is scheduled to increase 2.8-fold during these five years. The domestic machinery production base created during the First Five-Year Plan period, the cadres of distinguished engineers and the accumulated experience in designing, construction and exploitation make it possible for the Soviet Union to solve all these stupendous problems in reliance upon its own resources.

FUEL

THE task facing the fuel industry for the period of the Second Five-Year Plan is the further rapid development of fuel production, the object being to secure the complete and uninterrupted satisfaction of the requirements of national economy, to create the requisite reserves and a stable fuel supply, and to accelerate by every means the growth of fuel production in the new regions and in the regions producing fuel of local importance, so as to eliminate long-haul fuel transportation as soon as possible.

In accordance with the projects mapped out for the development of the basic industries of national economy, the Plan estimates the total fuel requirement of the industrial and technological group of consumers to be 175,000,000 tons of conventional fuel [1] in 1937, *i.e.*, 189.9 per cent of the requirement in 1932. Not less than 196,400,000 tons of conventional fuel, or 199.8 per cent of the quantity needed in 1932, are required to cover the above consumption as well as to satisfy other consumers and accumulate the required reserves.

A further improvement in the structure of the fuel balance must be achieved in the period of the Second Five-Year Plan by increasing the proportion of coal and oil shale, and by reducing the percentage of wood and oil fuel. The following are the general changes in the structure of fuel production in the U.S.S.R. as a whole under the Second Five-Year Plan:

Kinds of fuel	1913	1927-28	1932	1937
	(in % of total)			
Wood for the industrial and technological group of consumers	25.2	17.4	14.5	9.6
Peat	1.4	3.8	5.4	5.2
Oil shale	—	—	0.1	0.4
Coal	54.5	60.5	60.3	66.6
Heavy oil fuel	18.9	18.3	19.7	18.2
Total	100.0	100.0	100.0	100.0

The growth of consumption by individual groups of consumers demonstrates the improvement in the structure of the fuel

[1] One metric ton in conventional fuel represents 7,000,000 large calories.

balance by the end of the Second Five-Year Plan period. Particularly rapid is the growth of fuel consumption for coking, carbonization and distillation (a 119.7 per cent rise) which is necessitated primarily by the tremendous increase in coke production. Fuel consumption by electric stations is increasing 140.8 per cent; by railroads—66.4 per cent. Fuel consumption by the remaining consumers is increasing 70 per cent. The necessary fuel reserves are being accumulated at the same time.

It is not only the quantitative growth of fuel production that will secure a stable fuel balance for the U.S.S.R. This balance will also be secured to a great extent by effecting structural and qualitative improvements in the consumption of fuel. The increasing number of new units of large capacity and the reconstruction of the heat-and-power system, the growing electrification of all the industries of national economy as well as the increased proportion of hydro-electric power, the yield and utilization of a great number of combustible by-products (coke and blast-furnace gases) by industry, etc., make it possible to obtain a considerable saving of primary fuel in industry.

Thus, the rate of fuel consumption by locomotives must be reduced from 282 kg. in 1932 to 250 kg. in 1937 per 10,000 gross ton-km.; the average consumption of fuel in central stations per kilowatt hour of power generated is dropping 23 per cent (exclusive of heat production); the coke consumption rate of blast furnaces is being reduced 15 to 25 per cent.

The power resources supplementary to primary fuel will be very considerable in 1937: there will be about 4,500,000 tons of conventional fuel in the form of hydro-electric power; about 9,300,000,000 cu. metres or 5,300,000 tons of conventional fuel in coke gas; about 64,000,000,000 cu. metres or 8,200,000 tons of conventional fuel in blast-furnace gas, etc.

Finally, the introduction of more highly perfected systems of furnaces, boilers and other equipment will considerably increase the efficiency factor of the whole heat-and-power system of the industry.

COAL

In 1937 coal will constitute 66.6 per cent of the total fuel resources, as against 60.3 per cent in 1932. Thus in the course of the Second Five-Year Plan period, coal is becoming the basic factor in the fuel balance to an even greater extent than it was in

the period of the First Five-Year Plan. The output of coal is growing considerably more rapidly than the production of fuel as a whole—an increase for coal to 237 per cent of the 1932 figure as compared with an increase to 199.8 per cent of the 1932 figure for fuel production as a whole. The following table shows the level and rate of coal production as well as the geographic distribution of the coal industry:

COAL PRODUCTION
(thousand tons)

Basins and districts	1932		1937		1937 in % of 1932
	Output	Percentage of total	Output	Percentage of total	
Donetz Basin	43,847	68.2	80,000	52.5	182.5
Moscow	2,850	4.4	10,000	6.5	350.9
Ural Basins	3,106	4.8	13,000	8.5	418.5
Kuznetsk Basin	7,040	10.9	20,000	13.1	284.1
East Siberian Basins	2,176	3.4	4,500	3.0	206.8
Central Asia	720	1.1	3,000	2.0	416.7
Far East Basins	1,974	3.1	6,500	4.43	329.3
Karaganda	722	1.1	7,000	4.6	—
Total for main basins	62,435	97.0	144,000	94.5	230.6
of which:					
Under P. C. Transp.	2,459	—	7,700	—	313.1
New regions as a whole	443	0.7	6,000	3.9	1,354.4
Handicraft co-operative organizations	1,456	2.3	4,500	3.6	171.7
Total for the U. S. S. R.	64,334	100.0	152,500	100.0	237.0

In accordance with the shifting of industry eastward, with the development of the new industrial regions and the need to reduce coal shipments, the new coal-producing districts are developing during the period of the Second Five-Year Plan at a rate far in excess of that applying to the old coal base of the Union. This is the reason why the proportion which the Donetz Basin coal forms of the total coal production of the Union will drop in 1937 to 52.5 per cent as against 68.2 per cent in 1932.

Parallel with the tremendous development of the Kuznetsk Basin—the second coal base in the Soviet Union—the coal bases of the Far East and of Central Asia are likewise undergoing considerable expansion.

Of great importance is the creation of a coal base in the North (Pechora and Spitzbergen), which makes it unnecessary for the Far North to consume long-haul Donetz fuel.

Under the First Five-Year Plan a great number of pits were sunk, some of which had already commenced operations while others were still in the course of construction at the commencement of the Second Five-Year Plan period.

The total capacity of the pits in operation on January 1, 1933, was 110,700,000 tons, while the full projected capacity of the mines under construction was 142,300,000 tons. It must be borne in mind that part of the pits which are now in operation will be closed during the Second Five-Year Plan period due to the exhaustion of their resources. Consequently, of the 110,700,000 ton capacity mentioned above, only 95,600,000 tons, yielding an output of 75,100,000 tons, will remain in operation in 1937, *i.e.*, the total capacity will be utilized to the extent of 78.5 per cent.

The remaining output will be procured from the pits which start operations in the course of the Second Five-Year Plan period These pits represent a projected capacity of 143,000,000 tons. whereas their average annual capacity in 1937 (allowing for the exhaustion of some of the pits) will amount to 125,300,000 tons, yielding 64,200,000 tons, *i.e.*, a 51.2 per cent utilization factor.

The output of pits to be sunk in the second quinquennial period will amount in 1937 to 6-8 per cent of the total output of the chief trusts. The capacity of all operating pits will thus total 221,000,000 tons in 1937.

It should be noted that out of the total output of 152,500,000 tons, 113,500,000 tons or 75.5 per cent will be produced by new pits, or by pits which have undergone major reconstruction, and either have started or will start operations in the course of the First and Second Five-Year Plan periods. In regions other than the Donetz Basin, the output of the new pits will constitute 92-95 per cent.

In the period of the Second Five-Year Plan, 178 pits representing a capacity of 143,000,000 tons must start operations, as against 179 pits of a total capacity of 56,900,000 tons which started operations in the period of the First Five-Year Plan. It is projected to invest a total of 3,500,000,000 rubles under the Second Five-Year Plan as against 1,814,000,000 rubles under the First Five-Year Plan.

Parallel with the vast program for pit construction, huge investments will be made in the period of the Second Five-Year Plan for housing and municipal construction as well as for the organization of surface operations.

There will be a considerable rise in the average factor of util-

ization of the projected capacity of all pits. In 1937 it will reach 63 per cent as against 50 per cent in 1932. The average capacity per production unit—the pit—is rising from 130,000 tons in 1929 and 330,000 tons in 1933 to 425,000 tons in 1937.

The essential conditions on which the further growth of the coal industry in the period of the Second Five-Year Plan depends are the mechanization of the whole coal industry and the consequent improvement in labour productivity. It is the task of the Second Five-Year Plan to raise the mechanization of cutting in the main trusts to 93 per cent and the mechanization of gathering to 90 per cent. The mechanization of underground haulage, including haulage by engines with trolley wires, must be brought up to 80 per cent. The weakest point hitherto has been the loading of coal, which until recently remained absolutely unmechanized. The problem is to achieve at least 20 per cent mechanization of loading operations by the end of the Second Five-Year Plan period. Decided progress must be made in the mechanization of surface operations, particularly transportation, loading and unloading. The mechanization of surface operations must be raised to 60 per cent, which will make it possible to increase the proportion of workers engaged in the direct production of coal. In a number of regions where the coal layers are not very far from the surface steam shovels must be used as mechanized means of coal mining.

It is imperative in the period of the Second Five-Year Plan to achieve a more decided improvement in the mechanization of preparatory work and in the mechanized back-filling of spaces worked out on rich layers in a number of basins. A very important task in technical reconstruction is the substitution of electric equipment for pneumatic equipment, large-scale introduction of stationary lighting for underground works and the mechanization of the transportation of miners to and from the face.

By the end of the Second Five-Year Plan period it is projected to raise the use factor of the cutting machines 100 per cent and of pneumatic pick-hammers—50 to 60 per cent as compared with their utilization in 1932.

In the period of the Second Five-Year Plan the shift to standardized machinery in the coal industry of the U.S.S.R. is being completed.

During this period the U.S.S.R. is advancing to first place in the world in level and type of mechanization of its coal industry.

LEVEL OF MECHANIZATION OF COAL INDUSTRY IN U.S.S.R. AND CAPITALIST COUNTRIES

Countries	Years	Percentage of total output			
		Cutting	Gathering	Haulage	Loading
U.S.S.R.	1932	65.4[1] / 71.9	76.5 / 85.5	15.0 / 12.3	—
	1937	93.5 / 98.0	90	80.0	20.0
U.S.A.	1929	75.4[2] / 1.64	—	85.0	10.5
Germany (Ruhr)	1931	84.0[3] / 95.8	54.0	90.0	3.0
Great Britain	1932	35.0	17.5	50.0	—
France	1929	72.0[4]	—	—	—

[1] Numerator gives the figure for the whole U.S.S.R., denominator for the Donetz Basin.

[2] Numerator gives the figure for bituminous coal, denominator for anthracite in 1930.

[3] Numerator gives the figure for the whole of Germany, denominator for the Ruhr.

[4] Only mines located in Pas-de-Calais.

Note: The figures for the capitalist countries are taken from *Glückauf* and *Iron and Coal Trades Review*.

The superior type of mechanization of the coal industry in the U.S.S.R. is characterized first and foremost by the predominance of the cutting machine in cutting operations. In Germany the mechanization of cutting operations is based essentially on the use of pneumatic pick-hammers.

In the period of the Second Five-Year Plan the coal industry of the U.S.S.R. will be electrified to an even greater extent than that of Germany.

One of the most significant features of the superior type of mechanization of the coal industry of the U.S.S.R. in the period of the Second Five-Year Plan, when compared with the advanced capitalist countries, is the comprehensiveness of this mechanization. The mechanization of cutting, gathering and haulage in the U.S.S.R. will approximately be on a par, whereas in Great Britain, for instance, the level of mechanization of these different processes is very uneven.

The completion of the mechanization of the decisive production processes, the determined stand taken in favour of complete mechanization, the adoption of new methods and systems of

work, the improvement in the organization of labour and management and the strengthening of labour discipline assure a 91 per cent increase in the productivity of labour during the Second Five-Year Plan period. This corresponds to an output of 26.3 tons per month per toiler as against 13.8 tons in 1932. It is also projected to cut the cost of production of coal by 32.4 per cent during this period.

The chief problem in the five-year program of the coal industry is the question of achieving a radical improvement in the quality of coal to satisfy the demands of the metallurgical industry for higher grades of this fuel. With a program of pig-iron smelting calling for 16,000,000 tons in 1937, the total output of coke (allowing for other coke consumers) will amount to 21,300,000 tons as against 8,400,000 tons in 1932. The following is the estimated requirement of coal (ordinary coal without dressing) for coking, calculated according to the different kinds of coal:

Kinds of coal	1932	1937	1937 in % of 1932
	(in thousand tons)		
Donetz	9,918	21,600	217.7
Kuznetsk	1,636	5,600	342.2
Karaganda	—	2,500	—
Kizel	—	1,775	—
Suchansk	10	90	—
Total	11,664	31,565	270.6

Such an increased demand for coking coal involves a decisive increase in the output of sintering coal in the Donetz Basin and the extension of the range of coals for coking, both by dressing the coal and by increasing the addition of lean and gas coal. At the same time the experiments of blast-furnace smelting with anthracite must be speeded up and the consumption of sintering coal for power requirements (for transportation facilities and industry) must be sharply reduced.

In 1937 the capacity of large concentrating apparatus in the coal industry will be brought to 40,000,000 tons, the average ash content of coal for metallurgical purposes will be reduced in the Donetz Basin to 8.5 per cent as against 11.31 per cent in 1932, of sulphur content—to 1.6 per cent as against 2.59 per cent respectively; in the Kuznetsk Basin—to 7.5 per cent of ash in 1937 as against 9.42 per cent in 1932 and to 0.4 per cent of sulphur as against 0.5 per cent respectively.

OIL

The controlling factor in determining the tasks to be set the oil industry for the period of the Second Five-Year Plan is the tremendous growth of aircraft, motor vehicles and tractors.

The scale of production and consumption of the light oil products in the period of the Second Five-Year Plan is characterized by the following figures: the output of gasoline is rising from 2,459,000 tons in 1932 to 6,500,000 tons in 1937. At the same time the consumption of gasoline by motor vehicles will increase more than 6.5 times, reaching 3,000,000 tons in 1937.

The output of kerosene is rising from 4,203,000 tons in 1932 to 7,500,000 tons in 1937. The growth of kerosene consumption is largely determined both by the increase in the number of tractors and by the increase in general consumption.

The production of ligroin is increasing from 422,000 tons in 1932 to 1,700,000 tons in 1937 in connection with the increased number of caterpillar tractors.

For 1937 the output of crude oil is scheduled to be 44,300,000 tons, plus 2,500,000 tons of gas, giving a total of 46,800,000 tons as against 22,300,000 tons in 1932, *i.e.*, an increase to 210.1 per cent of the 1932 output.

Part of the tractors and motor vehicles will be re-equipped to burn heavy Diesel fuel, the consumption of which for the said purpose is scheduled to be about 1,000,000 tons.

The following changes will take place in the geographic distribution of oil-producing centres:

Oil Trusts	1932		1937		1937 in % of 1932
	Oil and gas produced	Percentage of total	Oil and gas produced	Percentage of total	
Azerbaijan Oil Trust . .	12,632	56.72	29,500	63.0	233.5
Grozny Oil Trust	8,064	36.21	9,750	20.8	120.9
Maikop Oil Trust . . .	1,010	4.53	1,800	3.9	178.2
Emba Oil Trust	249	1.12	1,700	3.6	682.7
Sakhalin Oil Trust . . .	203	0.91	800	1.7	394.1
Central Asian Oil Trust .	66	0.30	350	0.7	530.3
Turkmenistan Oil Trust .	34	0.15	1,100	2.4	—
Eastern Oil Trust . .	11	0.05	1,350	2.9	—
Georgian Oil Trust . . .	3	0.01	450	1.0	—
Total	22,272	100.0	46,800	100.0	210.1

A particularly considerable increase in output is expected in the new districts. Their percentage of crude oil output will rise from 2.53 per cent in 1932 to 12.3 per cent in 1937. With industry and agriculture developing on a gigantic scale, the problem of rapidly developing and mastering these new districts becomes of exceptional importance.

In 1937 it is intended to refine 38,000,000 tons of oil and to obtain the following quantity of basic oil products:

Indices	1932 (thousand tons)	1937 (thousand tons)	1937 in % of 1932
Gasoline	2,459	6,500	264.3
Ligroin	422	1,700	402.8
Kerosene	4,203	7,500	178.4
Lubricating oils	680	2,000	294.1
Motor oil	1,250	4,500	355.0
Masut	8,530	12,300	144.2

During the Second Five-Year Plan period a new group of oil refineries must be constructed (46 tube-stills for primary distillation, 93 cracking plants) and the following oil and gas-refining installations will have to start operations: 35 tube-stills for primary distillation, with a capacity of 17,500,000 tons; 85 cracking plants of 12,750,000 tons capacity; 16 tube-stills of 3,840,000 tons capacity for distilling lubricating oil.

The capacity of the distilling plants shows a sharp increase, as may be seen from the following data:

Indices	On January 1, 1933 (thousand tons)	On January 1, 1938 (thousand tons)	Jan. 1, 1938 in % of Jan. 1, 1933
Tube-stills and cube batteries for primary distillation	23,400	40,900	174.4
Cracking plants (for raw material)	3,030	15,780	520.8
Lubricating oil refineries (from raw material)	3,961	7,800	196.9

The new plants for oil distillation will be erected chiefly on the Volga River.

A most important element in the oil production program for the Second Five-Year Plan period is the question of drilling. The total drilling meterage will be raised from 744,100 metres in 1932 to 3,972,000 metres in 1937, *i.e.*, by 433.4 per cent, including the

increase in prospecting drilling from 132,100 metres to 821,500 metres, or 6.2 times the former figure.

During the course of the Second Five-Year Plan period it is necessary to drill 11,500,000 metres as against 2,543,000 metres drilled under the First Five-Year Plan. The proportion of prospecting drilling in the total amount of drilling is increasing from 17.7 per cent in 1932 to 19.5 per cent in 1937. The proportion of drilling done in new districts is rising sharply—from 15 per cent to 36.5 per cent of the total. It is imperative to prospect and master the exploitation of a number of new oilfields in the course of the Second Five-Year Plan period: a) under the Azerbaijan Oil Trust: Lok Batan, Kala, Karachkhur, Sulu Tepe and Kergez; b) under the Grozny Oil Trust: Malgobek, Kayakent, the Gornochechensk District; c) under the Maikop Oil Trust: the Black Sea District; d) under the Emba Oil Trust: Kosh Chagil, Shubar Kuduk, South Iskine, Sagiz, Baichunas; e) under the Eastern Oil Trust: Sterlitamak and others.

In the period of the Second Five-Year Plan the construction of a number of pipe-lines, to extend over a distance of more than 4,000 km., has been projected. Among these are the Emba-Orsk oil pipe-line, 895 km. long (including its branches), the construction of which will be completed; the continuation of the Nikitovka-Dnieper oil-products pipe-line, 242 km. in length; the Grozny-Armavir pipe-line, 400 km. long and the Makhach Kala-Voronezh pipe-line, 1,368 km. long, etc.

For the Second Five-Year Plan period it is planned to invest 4,700,000,000 rubles in the oil industry as against 1,446,000,000 rubles expended for the same purpose in the course of the First Five-Year Plan period.

While drilling absorbed 32 per cent of capital investments under the First Five-Year Plan period, such investments under the Second Five-Year Plan represent 41.7 per cent.

As a result of the huge expenditures for drilling, the proportion of yield from the new wells is growing from 27.2 per cent in 1932 to 44.0 per cent in 1937. The average depth of the wells is increasing from 770 metres to 1,000 metres. The average speed of drilling of all kinds is specified as 300 metres per drill-month in 1937, as against 108.3 in 1932.

The task of bringing the speed of drilling to 300 metres is absolutely feasible and can even be overfulfilled. As a result of applying a number of new technical improvements, the oil indus-

try of the United States has achieved a drilling speed of 600 to 800 metres per drill-month.

The average cost of drilling is being reduced from 204.9 rubles per metre in 1932 to 120 rubles in 1937.

The productivity of labour per worker is rising from 1,500 tons in 1932 to 2,000 tons in 1937.

In the course of the First Five-Year Plan period the oil-producing industry was re-equipped to attain a high technical level. This technical development must be continued in every direction. Particularly urgent is the task of increasing the speed of drilling, of mastering deep drilling and of introducing turbine drilling, so as to increase its proportion from 2.6 per cent in 1932 to 12 per cent in 1937.

The problem of mastering pipeless exploitation and the one-pipe gaslift as well as the application of the Mariette method, etc., is to be solved in the course of the Second Five-Year Plan period.

In oil refining, the further increase in the output of gasoline and kerosene by existing installations is to be achieved by introducing air-tight systems and bringing selection norms nearer to the level of potential contents; also by introducing the steam-phase cracking plant and by adopting hydrogenation on a larger scale. The primary distillation of oil will essentially be concentrated in the period of the Second Five-Year Plan in highly perfected systems of tube-stills and in radically reconstructed cube batteries.

Parallel with the development of cracking-plant construction there is the problem of increasing the output of cracking gasoline to 25 per cent of the cracking raw material. This makes it possible to increase the production of cracking gasoline to 3,500,000 tons in 1937 as against 591,000 tons in 1932, or a 5.9-fold increase. The general structure of oil refining is changing considerably in the direction of an increased proportion of gasoline and kerosene.

KINDS OF OIL PRODUCTS

(in % of crude oil distilled)

Indices	1913	1932	1937
Gasoline and ligroin	2.73	14.2	21.6
Kerosene	26.6	20.2	19.7
Masut	55.0	48.5	32.4

Quite a few refineries have already succeeded in raising their yield of gasoline and kerosene to 40-45 per cent. In the United States this percentage is 60-65 per cent.

In the period of the Second Five-Year Plan the most important processes in drilling are being made automatic and the other laborious processes on the oilfields and in the refineries are being mechanized.

One of the fundamental tasks of the oil industry in the Second Five-Year Plan period consists in mastering as soon as possible all the achievements of this industry in the advanced capitalist countries.

The oil industry of the U.S.S.R., which can base its technical reconstruction on the advanced Soviet machinery industry, possessess all the prerequisites for the successful fulfilment of the task of overtaking the oil industry of the United States with regard to technique.

PEAT

The scope of development of peat production during the Second Five-Year Plan period is as follows:

	1932 in tons	1937 in tons	1937 in % of 1932
Total output in the U.S.S.R.	13,490,000	25,000,000	185.3
of which:			
Chief Peat Board of P. C. of Heavy Industry	10,740,000	19,000,000	176.9

The proportion of the Leningrad Region in the output of peat is rising from 11.2 per cent to 13.5 per cent, of the Gorky Territory—from 9.1 per cent to 10.5 per cent, of the Urals—from 3.08 per cent to 8 per cent.

In the period of the First Five-Year Plan, the peat industry mastered the modern methods of mechanized peat extraction and achieved decisive victories in mechanizing this field of production. Essentially the development of peat production in the period of the Second Five-Year Plan will follow the line of reinforcing and further developing the existing methods of peat extraction. The percentage of mechanized extraction is increasing from 49.7 in 1932 to 71.7 in 1937. The output by the milled and the milled-moulded methods is growing from 27.5 per cent to 40.4 per cent. The central task of mechanization in the peat industry in the period of the Second Five-Year Plan consists in forcing the development of the backward processes of work—drying, gathering and transportation.

The securing of a continuous output all year round and the elimination of the seasonal character of work in the production of peat present very important problems of the Second Five-Year Plan period.

The sum of 600,000,000 rubles has been assigned as capital investment to the peat industry under the People's Commissariat of Heavy Industry for the period of the Second Five-Year Plan, as against 398,000,000 rubles assigned for this purpose under the First Five-Year Plan.

The aggregate projected capacity of the peat-fields will amount to 27,000,000 tons in 1937, the output of the All-Union Peat Association accounting for 19,000,000 tons.

The peat industry will supply fuel to large industrial units such as the Shatura Power Station, the Gorky State Regional Power Station, the Ivanovo State Regional Power Station, the Dubrovka Station, the Yaroslavl Rubber Combination, the Ural Machinery Plant, the Ural Railroad Car Works and others.

As a result of the huge capital investments and the projected level of mechanization as well as of the tempo at which the material basis of the peat industry is to be assimilated, the productivity of labour in the peat industry will be increased by 52.0 per cent with the industry working 90 days a year. The number of shifts is increasing from 2.0 to 2.4 while the equipment-utilization factor will improve from 68 per cent to 80 per cent.

OIL SHALE

The extraction of oil shale by the All-Union Oil Shale Association is increasing from 193,000 tons in 1932 to 2,600,000 tons in 1937, including 750,000 tons in the Leningrad Region, 1,100,000 in the Middle Volga Territory, 650,000 tons in the Lower Volga Territory and 100,000 tons in all other regions.

The Second Five-Year Plan provides for starting the construction of 8 huge oil-shale mines whose total output capacity will be 5,300,000 tons. Six of these mines having a capacity of 3,400,000 tons will commence operations during the stated period.

It is projected to sink 3 pits of 1,800,000 tons aggregate capacity in the Leningrad Region. A capacity of 1,500,000 tons must be opened to exploitation in the period of the Second Five-Year Plan.

Two mines of 2,000,000 tons capacity are to be sunk in the oil-shale fields of the Middle Volga Territory.

One mine of 500,000 tons capacity is to be constructed and opened for exploitation in the oil-shale fields of the Saratov Territory.

The total capacity of the mines to be sunk in the Gorky Territory will amount to 1,000,000 tons.

The mechanization of oil-shale extraction will be carried out during the Second Five-Year Plan period. It will be on a scale equal to that prevailing in the coal industry.

The program for the development of the oil-shale industry stipulates a vast development of scientific exploration, which may be expected to lead to a still greater use of oil shale both as fuel and for chemical processes. The scientific research institutions must solve the specific problem of ascertaining the most effective combustion of oil shale in stationary furnaces.

IRON AND STEEL INDUSTRY

THE Second Five-Year Plan has set the task of achieving in 1937 the production of 16,000,000 tons of pig iron, 17,000,000 tons of steel, 13,000,000 tons of rolled steel and 1,100,000 tons of iron piping, as compared with 6,200,000 tons of pig iron, 5,900,000 tons of steel, 4,300,000 tons of rolled steel and 310,000 tons of iron piping produced during the last year of the First Five-Year Plan period.

The increase in the output of rolled steel by nearly 9,000,000 tons deserves particular attention. The solution of this problem will put an end to the backwardness of the iron and steel industry when compared with the general tempo of development of national economy. While the total output of the industries under the People's Commissariat of Heavy Industry will increase 2.3 times, the production of rolled steel will be tripled. The manufacture of first-grade railroad rails in particular is growing during the period in question from 332,000 tons to 1,300,000 tons, *i.e.*, almost 4 times.

During the First Five-Year Plan period iron and steel were distributed with an eye to ensuring the maximum development of the machinery industry.

During the Second Five-Year Plan period the iron and steel industry will be in a position to meet both the growing demand of the machinery industry for iron and steel and the requirements of other branches of national economy as well, with the railroads in first place.

The supply of first-grade rails to the railroads during the Second Five-Year Plan period must amount to 3,700,000 tons, whereas under the First Five-Year Plan it was 1,268,000 tons. The share of rolled steel assigned to the railroads (including rails, but not the rolled steel used in different manufactures or in equipment) is growing from 10.5 per cent in 1932 to 15.2 per cent in 1937. Just as striking will be the rise in the proportion of iron and steel supplied to the People's Commissariat of Waterway Transportation. In 1932 agriculture received only 0.9 per cent of the total output

of rolled steel (exclusive of the metal used in machines and tractors). In connection with the great increase in repair and machine shops for agriculture, the Plan provides for an increase of from 47,000 tons in 1932 to 250,000 tons in 1937 in the iron and steel consumed by agriculture. The supply of metal to the lumber industry for the purpose of mechanizing lumbering operations, to the food industry (tin for canned goods, band iron, metal for repairs), to light industry, to municipal utilities, etc., will be increased several times.

The amount of rolled steel supplied to the metal-working plants by the Chief Boards of Machinery Manufacture of the People's Commissariat of Heavy Industry is increasing from 2,045,000 tons in 1932 to 4,690,000 tons in 1937.

Tripling the output of rolled steel during the Second Five-Year Plan involves the creation of a powerful new production apparatus.

About one-half of the total output of 1937 will be supplied by the new equipment to be installed during the Second Five-Year Plan period, *viz.*, 50 per cent of the pig iron and steel, 44 per cent of the rolled steel, 54.3 per cent of the iron piping. At the same time, 46.5 per cent of pig iron and 36 per cent of steel will be accounted for by new plants. However, if the new equipment, which was installed during the First Five-Year Plan period and is basically advanced in its technique, be taken into account as well, the new units will deliver 80 per cent of the total pig iron smelted and 63 per cent of the total steel output.

One of the principal tasks to be accomplished during the Second Five-Year Plan period will be the mastery in the shortest possible time of the new equipment already in operation, as well as that to be installed during the said period. This involves a sharp rise in the coefficient of votumetric efficiency of blast furnaces, open-hearth furnaces and other units, as well as a decrease in the proportionate consumption of raw material and fuel, and consequently a considerable reduction in cost of production.

The coefficients of volumetric efficiency of old blast furnaces in the South which handle the Krivoy Rog ore will improve from 1.56 in 1932 to 1.2 in 1937, *i.e.*, by 30 per cent.

The daily steel output of the Steel Association open-hearth furnaces per square metre of area (per heat period) will rise from 2.97 tons in 1932 to 4.12 tons, *i.e.*, by 38.7 per cent.

The volumetric efficiency projected for the large new blast furnaces handling the Krivoy Rog lump ore and agglomerate as well as for the Magnitogórsk furnaces is 1.0, *i.e.*, 1,200 tons of pig iron are to be smelted per day. For the new large open-hearth furnaces working 310 days the planned production rate is 4.5 tons per square metre per 24-hour heat, *i.e.*, 93,000 tons of steel per annum for a standard furnace having a hearth area of 66.5 sq. metres.

The consumption of coke per ton of pig iron is being reduced from 1.162 tons to 0.950 tons for the Southern plants, *i.e.*, over 18 per cent, and from 1.498 tons to 1.100 tons, or 27 per cent in the old Ural plants.

This reduction is to be obtained by treatment of the charge (sorting and agglomeration of ores, crushing the limestone, etc.) on the one hand, which will result in a considerable saving of fuel, and on the other by the improved quality of coke, primarily by reducing the ash and sulphur content.

Construction for the iron and steel industry (plus the iron-ore industry) will call for the investment of 9,340,000,000 rubles in the course of the five years as against 3,000,000,000 rubles invested under the First Five-Year Plan.

The Second Five-Year Plan must bring the completion of the construction of the following units:

Magnitogorsk Plant . .	8 blast furnaces, 27 open-hearth furnaces, 3 rolling mill shops.
Kuznetsk Plant . . .	4 blast furnaces, 15 open-hearth furnaces, 2 blooming mills.
Azov Steel Plant . . .	5 blast furnaces, acid and basic open-hearth departments, 1 blooming mill.
Krivoy Rog Plant . . .	(first stage) 4 blast furnaces, 1 Bessemer converter and 1 open-hearth department, 1 blooming mill.
Zaporozhye Plant . . .	4 blast furnaces, 3 steel-smelting shops, 3 rolling-mill shops, a ferro-alloy department.
Tagil Plant	3 blast furnaces, 8 open-hearth furnaces, 1 blooming mill, 4 rolling mills.
Lipetsk Plant	2 blast furnaces.
Tula Plant	2 blast furnaces.
Nikopol Plant	pipe-rolling shops and 1 blooming mill.
Pyervo-Uralsk Pipe-Rolling Mill	3 pipe rolling mills.
Chelyabinsk Pipe-Welding Plant	2 pipe-welding mills.
Petrovsk (Transbaikalia) Plant	2 blast furnaces, 3 open-hearth furnaces, 2 rolling mills.

The Novo-Moskovsk Tin-Rolling Mill, the Sinarsk and Makeyevka Pipe-Casting Plants as well as the Leningrad Steel Foundry are also scheduled for completion. The construction of the Bakal Plant (putting 2 blast furnaces, 6 open-hearth furnaces, 1 blooming mill and 1 rolling mill into operation), of the Khalilovo Plant, of the Second Kuznetsk Plant and the Far East Plant with the first units to be set in operation will be developed on an extensive scale. The construction of the Dashkesan Plant will be started. The rise in the output of railroad rails can be attributed to putting 3 huge rolling mills in operation: the Kuznetsk Plant (already in operation), the Azov Steel and the Magnitogorsk Plants.

The Tagil Plant must become the source of metal supply for the gigantic car-building plant which is being erected alongside of it, as well as for the Verkhne-Saldinsk Plant and the Ural Machinery Plant. The Bakal Plant for special steels will serve the Chelyabinsk Tractor Plant, the Pyervo-Uralsk Pipe-Rolling Plant and the automobile plants of the East. The Zaporozhye Plant is to become the all-Union source of supply for high-grade sheet metal and will serve the automobile industry of the central regions. The Khalilovo Plant, which is smelting ore containing nickel and chromium, must turn out high-grade alloyed cast iron in addition to producing a number of types of chrome-nickel steel.

The Nikopol and Pyervo-Uralsk Plants will become the main sources of small-diameter seamless drawn tubing supply for the machinery industry.

In the course of the Second Five-Year Plan period the radical reconstruction of the following plants must be completed: the Makeyevka, Dzerzhinsky, Karl Liebknecht, Electric-Steel, Zlatoust, Chussovaya and Vyksa Plants. This reconstruction virtually amounts to the construction of new plants. The object of large-scale reconstruction work on other large plants in the South and elsewhere is to raise technical standards, to mechanize laborious processes, improve the treatment of raw materials, reconstruct transportation facilities and the power supply, and lay gas pipes. This work will often involve the construction of new units. The blast-furnace units of the Petrovsky, the Stalin and the Rykov Plants are being mechanized. Agglomeration plants will be built in all the large blast-furnace plants. Finishing and heat-treating departments will be erected in all the plants engaged in the production of high-grade steel (Red October, Ilyich Plant at Mariu-

pol and others). New pipe-rolling mills will be installed at the Karl Liebknecht, the Taganrog and the Mariupol Plants; a wheel-rolling mill will be installed at the Karl Liebknecht Plant; a new pipe-casting shop will be added to the Lipetsk Plant and a new steel-shape foundry to the Hammer and Sickle Plant.

The machine aggregates to be constructed and started will total 45 blast furnaces, 164 open-hearth furnaces, 2 converter shops, 107 rolling mills (including 13 blooming mills and 1 slabbing mill), 14 pipe-rolling mills, 4 pipe-welding units besides a considerable number of electric furnaces and pipe-casting units.

The construction program for new units makes provision for production reserves. On January 1, 1938, the annual capacity of the iron and steel industry will be about 21,800,000 tons of pig iron and 22,500,000 tons of steel.

The Soviet iron and steel industry will occupy first place in Europe not only in extent of production but also in capacity of production equipment. The greatest quantity of steel ever smelted in Germany (1929) was 16,200,000 tons, whereas the capacity of its production equipment is estimated at 18,000,000 tons of steel.

The construction program of the Second Five-Year Plan stipulates that the second powerful metal base, located in the East, be completed and that new metal-producing districts (East Siberia, the Far Eastern Territory) be created. The new units are to be distributed over the Soviet Union as follows:-

Machine aggregates	South	Central Area	Urals, Bashkiria and Middle Volga	Siberia and Far Eastern Territory	East in % of total
Blast furnaces	22	4	13	6	42
Open-hearth furnaces . .	58	29	60	17	51
Rolling mills	52	9	38	8	43

The share of the East in the total iron and steel to be smelted is rising sharply. There will be an increase in the proportion of pig-iron smelting in the Central Area, accompanied by a reduced output of steel, rolled steel in particular. This is due to the fact that the iron and steel industry of the Central Area smelts its steel from scrap, the supply of which is growing at a considerably slower rate than the general smelting of metals throughout the

country. Furthermore a growing proportion of steel smelting by the plants of the Central Area will be accounted for by casting and not by rolling. It is the giants of the South and the East, such as the Zaporozhye and Magnitogorsk Plants, that will become prominent producers of rolled steel.

PRODUCTION OF PIG IRON AND ROLLED STEEL BY DISTRICTS
(in % of total)

Districts	Pig iron			Rolled steel		
	1927-28	1932	1937	1927-28	1932	1937
South	72.8	69.9	59.2	59.0	64.1	56.0
Central Area	5.8	5.8	8.0	15.6	19.1	11.7
East	21.4	24.3	32.8	25.4	16.8	32.3
of which:						
a) Urals, Middle Volga and Bashkiria	21.1	20.2	24.8	25.2	16.2	24.6
b) West Siberia	0.2	4.1	7.7	0.2	0.6	7.2

Note: The rolled-steel output of the Red October Works in Stalingrad is included in the production of the Central Area.

The construction program of the iron and steel industry confronts the Soviet machinery industry with tremendous tasks. A total of 200,000 tons of metal-rolling and pipe-rolling equipment will have to be installed in Soviet works in the course of the five years. To appreciate the significance of this figure it must be remembered that the rolling equipment installed during the years of 1932-33 weighed 30,000 tons. It was only in 1931 that the production of this equipment was organized in the U.S.S.R. and its manufacture must be increased many times at the new Kramatorsk Plant, the Ural Machinery Plant, the Izhora and other plants.

The bulk of expenditures provided for in the construction program of the iron and steel industry will be absorbed by the rolling shops. Special attention must therefore be given to forcing the rate of development of these shops.

The proportion of the various items constituting the metal output must be considerably modified. Beginning with 1936 the smelting of steel will exceed somewhat the smelting of pig iron. However, the ratio between them (106.2 per cent in 1937) will still remain considerably lower than in Germany (121 per cent in 1929) or in the United States (133 per cent in 1929). This is due to the relatively small supply of scrap to be found in so young an industrial country as the U.S.S.R. On the other hand the decreased share of foundry pig iron in the total pig-iron output, a decrease

of from 30 per cent in 1932 to 22 per cent in 1937, symptomatic of the increasing supply of blast furnace pig iron, and the accelerated construction of steel-smelting shops make it possible within the next few years to overcome the present lag of steel production behind that of pig iron.

The construction of high efficiency Bessemer and basic open-hearth steel plants will speed up the output of steel.

The production of special steels was organized for the first time in the U.S.S.R. in the course of the First Five-Year Plan period. But even in the beginning of the Second Five-Year Plan period the U.S.S.R. was compelled to import some kinds of special rolled steel from abroad, particularly gauge steel, cold rolled strips and some high-grade sheet metal for automobiles. In the course of the Second Five-Year Plan period, the output of special rolled steel will increase from 555,000 tons to 2,000,000 tons, *i.e.*, more than 3.5 times. The production of automobile sheet metal will have a solid source of supply when the Zaporozhye Plant starts operations, for a powerful continuous thin-sheet rolling mill, the only one in Europe, will be installed there. Shops for calibration and cold-working of special metals will be installed in a number of plants (Hammer and Sickle, Nadyezhdinsk, Mariupol, Red October and others).

The reconstruction of the whole of national economy on the basis of the most up-to-date technique, and the use of powerful and high-speed machinery, of high pressure and high temperatures necessitate the demand for higher quality of the metal supplied.

The fraction of the total rolled-steel consumption represented by special rolled steels is therefore one of the hall marks indicative of the technical level achieved by the entire national economy. In 1937 the proportion of special steels manufactured in the U.S.S.R. will be more than 15 per cent, of which approximately 6 per cent will represent rolled alloy steels. In the United States in 1929 alloy steels represented 6.3 per cent of rolled steel. But in the United States the high percentage of special steels may be attributed to the tremendous role of the automobile industry in steel consumption. In the U.S.S.R., where this industry plays a much less important part in the consumption of steel, the high percentage of alloy steels testifies to a higher development of the other important branches of the machinery industry. Still more significant are the data for the smelting of electric steel, which is used in manufacturing highly important products.

Countries	Years	Output of Electric Steel	
		Thousand tons	Percentage of total steel smelted
U.S.S.R.	1932	101	1.7
	1937	600	3.5
U.S.A.	1929	967	1.7
Germany	1929	131	0.8
France	1929	151	1.6
Great Britain	1929	88	0.9
Italy	1929	211	9.9
Sweden	1929	113	16.2
Canada	1929	54	3.8

Note: The figures for capitalist countries are taken from *Statistics of the Iron and Steel Industries.*

Only the United States will lead the U.S.S.R. in the absolute quantity of electric steel smelted. However, the Soviet Union is outstripping the U.S.A. in the ratio of electric steel to the total steel smelting. Here the only countries in the lead of the U.S.S.R. will be Italy, Sweden and Canada which have only a small iron and steel industry and which, while poor in fuel resources, enjoy exceptionally cheap hydro-electric power.

In 1937 the U.S.S.R. will smelt more electric steel than France, Germany, Great Britain and Italy together smelted in 1929, the year when their post-war production was at its peak.

The completion of the Chelyabinsk, Dnieper and Zestafon Plants will emancipate the U.S.S.R. from the necessity of importing ferro-alloys from abroad.

The program provides for the smelting of ferro-silicon, ferro-manganese, ferro-chromium, ferro-tungsten and ferro-vanadium in electric furnaces.

The proportion of first-grade railroad rails will rise from 7.7 per cent to 10 per cent of the total output of rolled steel, and the technical specifications of these rails will be higher. The proportion of all other kinds of special steels, such as boiler and shipbuilding steel, pipe billets, wheel rims, rolled wheels, etc., will rise as well. Steel castings (550,000 tons in 1937) will furnish 3.2 per cent of the total steel smelted, compared with 2.4 per cent in Germany and 2.5-2.9 per cent in the United States. The ratio of the steel-pipe output to the output of rolled steel will increase from 7.2 per cent in 1932 to 8.5 per cent in 1937.

Hitherto most of the seamless drawn tubing for the manufacture

of machinery (fire-tubes, automobile tubing and various special tubing) was imported from foreign countries. In the course of the Second Five-Year Plan period the U.S.S.R. is becoming independent of the capitalist world in this line as well. The pipe-rolling plant for small diameter tubing now in the course of construction in Nikopol will be one of the biggest establishments of its kind in the world. The output of cast-iron pipes will be increased 3.6 times, and of tinned pipe—5 times.

In the U.S.S.R. the concentration of production has reached an exceptionally high level. In 1937, 70 per cent of the total output of pig iron in the U.S.S.R. will come from plants having a capacity of over 600,000 tons, as against 10.3 per cent in 1932. However, the U.S.S.R. will still be behind the U.S.A. in the number of giant plants. For at the end of 1937 the U.S.S.R. will possess 8 plants of over 1,000,000 ton annual pig-iron capacity each as against 16 such plants in the U.S.A. Germany in 1930 had 8 plants whose individual capacity was 1,000,000 tons, but this capacity was not fully utilized.

In the U.S.S.R. there will be 7 plants which will smelt over 1,000,000 tons of steel per annum as against 17 such plants in the U.S.A. But only an industrial titan like the Gary Plant will outstrip the Magnitogorsk Combination in production capacity.

In the U.S.S.R. the average annual smelting of pig iron per plant, exclusive of charcoal iron, will be 500,000 tons in 1937 as against 246,000 tons in 1932. In the U.S.A. the average smelting for 1929, exclusive of charcoal smelting, amounted to 367,000 tons, and in Germany—to 298,000 tons.

The average annual output of rolled steel per plant is rising from 65,000 tons to 178,000 tons per plant, and from 90,000 tons to 244,000 tons, exclusive of steel mills attached to machinery production plants.

All the new blast furnaces are being built on a large scale and are wholly mechanized. The average daily smelting of coke pig iron per furnace is rising from 247 to 475 tons, being surpassed in this respect by the American iron industry alone. There are only 2 furnaces in capitalist Europe whose volume is over 900 cu. metres; the United States has 17 such furnaces, but there will be over 40 of them in the Soviet Union. The ratio of pig iron produced by wholly mechanized furnaces is growing from 25 per cent to 80 per cent.

The open-hearth furnaces of 100 ton capacity and over will constitute 24 per cent of the total number of open-hearth furnaces

in the U.S.S.R. and will yield 46.3 per cent of the total 1937 output of open-hearth steel. In 1929 the percentage of large furnaces *of 100 ton capacity* and over was 28 in the United States and only 5.3 in Germany. The installation of 13 blooming mills in the U.S.S.R. will increase the percentage of shingled metal, *i.e.*, metal with improved inner structure, from 23 per cent to 62 per cent of the total rolled steel.

In addition to these blooming mills, there will be set in operation in the course of these five years: 11 continuous billet-mills, 1 continuous thin-sheet mill and 10 continuous merchant and wire-drawing mills.

The most modern types of rolling equipment will be installed for the use of the Soviet iron and steel industry during the Second Five-Year Plan period. The above-named continuous thin-sheet mill, producing 500,000 tons of sheet metal per annum, and the wheel-rolling mill which will be installed in Dniepropetrovsk can be cited as examples. There is only one other such mill in Europe (in Great Britain) and a few in the United States.

As a result of all this reconstruction, labour efficiency will be raised 100 per cent. The smelting of pig iron per blast-furnace worker will increase from 255 to 710 tons per annum, as against 1,700 tons in the United States in 1929 and 600 tons in Germany. When making this comparison, it must be borne in mind that the Soviet working day is only 7 hours long, that every sixth day is a free day and that Soviet workers receive a vacation every year. Consequently, the discrepancy between labour efficiency in Soviet blast-furnace shops and that in the United States is actually much less unfavourable to the U.S.S.R. than would appear at first sight.

* * *

In the course of the second quinquennium the iron and steel industry is being outfitted with the most advanced mechanized equipment, is mastering the technique of this equipment and is raising the efficiency of labour to the level of the advanced capitalist countries. Thus a strong foundation for the technical re-equipment of the whole national economy is being laid and the iron and steel industry inscribed on the roll of advanced and leading industries of the Soviet Union.

IRON ORE AND MANGANESE INDUSTRIES

IN 1937 the extraction of iron ore will reach 34,000,000 tons as compared with 12,100,000 tons in 1932, thus ensuring the smelting of 16,000,000 tons of pig iron, the accumulation of reserves and the satisfaction of other requirements.

The development of a number of new deposits will be started: in West Siberia—the Telbes group of mines which are to yield 800,000 tons of ore in 1937, and the mines of Gornaya Shoria 100 km. south-east of Kuznetsk; in the Urals—the Kusinsk titano-magnetites which contain titanium and vanadium in addition to iron; in the Middle Volga Territory—the rich deposits of the Khalilovo complex chromium-nickel ores; in the Central Black Soil Region—two large mines in the region of the Kursk Magnetic Anomaly with an estimated output of 400,000 tons in 1937; also the mineral deposits in the Far East.

A powerful ore-concentrating combination will be erected at the Kerch deposits in Kamysh Burun, with an output of 2,500,000 tons of agglomerate in 1937.

The total output of the new deposits in 1937 will amount to about 10,000,000 tons of ore, *i.e.*, 29.5 per cent of the total production. The Telbes and Gornaya Shoria ore will be worked up by the Kuznetsk works; the titano-magnetites—by the Bakal Plant and other works of the Urals. The Khalilovo ore will be worked up by a number of plants in the Urals and the Central Area until 1937; thereafter by the Khalilovo Plant. The agglomerated Kerch ore will be worked up by the Azov Steel Plant. Until the Kursk works are completed the Kursk ore will be worked up by plants located in the Donetz Basin and the Central Area.

Technical reconstruction will be completed in the Krivoy Rog mines and in the shafts located in the Urals and the Central Area. The output of ore extracted from the new and reconstructed mines, including those started during the First Five-Year Plan period, will amount to 26,500,000 tons, *i.e.*, 78 per cent of the total output.

On January 1, 1938, the projected production capacity of the mines will reach about 57,000,000 tons as against 23,000,000 tons

at the end of the First Five-Year Plan period. The capital investments to be made in the course of the five years will amount to 868,000,000 rubles for the iron-ore trusts alone. If investments in the Magnitogorsk and Kuznetsk Combinations, the Far East Works and the Dashkesan Works now in the course of construction are included, the total will exceed 1,000,000,000 rubles.

The annual output per worker must rise from 400 tons to 830 tons or 107.5 per cent.

Following are the changes in the percentages of ore output according to regions:

Regions	1927-28	1932	1937
	(In % of total)		
Krivoy Rog	78.0	65.3	47.0
East	16.5	26.3	33.0
Central Area	5.5	4.1	9.0
Crimea	—	4.3	11.0

The output of manganese ore (concentrate) is growing from 833,000 tons in 1932 to 2,700,000 tons in 1937, *i.e.*, 3.2-fold. Very energetic prospecting is necessary in order to shift the metallurgical industry of the East to a manganese-ore base of its own.

The extraction of manganese ores is distributed as follows according to regions:

	1932	1937
	(thousand tons)	
Chiatury	385	1,300
Nikopol	444	1,200
Other new districts	—	200

The Chiatury mines supply manganese ore to the Zestafon works and the eastern iron and steel industry, while Nikopol supplies the southern and central metallurgical works.

In the course of the five years, 112,000,000 rubles are being invested in the manganese industry.

A great advance in the concentration of iron-ore output is provided for.

In 1932, 59 pits were in operation in the Krivoy Rog iron-ore basin, the richest in the Union, with an average output of 135,000 tons of ore per pit.

In 1937 Krivoy Rog will have 40 pits in operation with an average output of 400,000 tons per pit. In 1932 there was not a single pit in Krivoy Rog having a capacity exceeding 800,000 tons.

There will be 12 such pits in 1937, including 2 with an annual output of 3,500,000 tons each.

The high concentration of output will supply the basis for the extensive mechanization of the production processes in the iron ore industry.

In 1932 most of the production processes in the Central Area—the Tula and Lipetsk mines—were performed by hand labour. In 1937 electric hoisting will take the place of horses, while electric haulage and scraper loading of ore at the face will be introduced.

In the Urals the technical reconstruction of the old Ural mines will be completed, in addition to the complete mechanization of the Magnitogorsk mines on American lines. As a result of this reconstruction, the mechanized extraction of iron ore in the U.S.S.R. is increasing in proportion from 35 per cent in 1932 to 85 per cent in 1937.

In order to secure the careful preparation of raw material for the iron and steel industry, the program for the Second Five-Year Plan period provides for a considerable increase in the concentration of ores. In 1932, only 200,000 to 250,000 tons of agglomerate were produced from Kerch ore, while in 1937 all Kerch ore will be agglomerated. In 1932 only 5 per cent of all Krivoy Rog iron ore was subjected to every type of dressing, including crushing and size sorting. It is planned to have 70 per cent of the ore dressed in 1937. In the South 60 per cent of iron ore destined for blast furnaces will be agglomerated in 1937.

By the end of the Second Five-Year Plan period, the iron-ore industry will attain the level of the most advanced enterprises in the world in technical equipment (with the exception of the small pits which are extracting the last of their mineral deposits).

NON-FERROUS METALS INDUSTRY

THE Second Five-Year Plan period is confronted by an extremely important task—the task of sharply increasing the production of non-ferrous metals. The tremendous scope of electric construction, particularly the widest development of high-voltage transmission lines, the electrification of industry, transportation and agriculture, the increase in the defensive strength of the country and the development of mass production of articles of general consumption such as radio sets and kitchen utensils call for vast quantities of copper, aluminium, lead and other non-ferrous metals. In order to solve this problem it is necessary "to put the non-ferrous metals industry in order" (Stalin), to complete its technical reconstruction, to reorganize the system of management in this industry and to reinforce it with new cadres.

According to the program of development of the non-ferrous metals industry, the solution for the problem of satisfying the non-ferrous metals requirements of national economy lies in the main in domestic output.

The program maps out the following production schedule for 1937:

	(in thousand tons)
Copper (billet)	135
of which:	
Copper from ores	117
Lead	115
Zinc	90
Aluminium	80

Copper: In the course of 1933 and 1934 the reconstruction of the old copper enterprises in the Urals and Transcaucasia was scheduled to be completed. During the same period the Krassno-Uralsk Combination, primarily its mining and concentration departments, was to be completely equipped. The capacity of the existing enterprises is 80,000 to 85,000 tons per annum. The completion of the Pyshma Electrolytic Plant will fully secure the electrolytic production of copper.

The Middle Ural (Revda) Combination will start operations in 1937 and will produce not less than 15,000 tons of copper. The Balkhash Combination, which will be built in stages, will yield its initial copper the same year. At first raw material will be shipped to it by water, later on over the Karaganda-Balkhash Railroad. The Second Five-Year Plan contemplates the development of the construction of a hydro-metallurgical plant at Almalyk (Central Asia), which will be completed in the course of the Third Five-Year Plan period.

In addition to the above, the solution of the problem of concentrating the ore extracted from the readily accessible Blyava deposits on the Middle Volga will make possible the construction of a copper-smelting plant to utilize these deposits.

On January 1, 1938, the capacity of all copper-smelting plants (including Blyava) will total 207,000 tons of copper from the ore. The technical standard of the new plants (the Middle Ural, the Red Ural and the Balkhash Combinations) will be on a par with the world's best equipped plants. It is expected that by the end of the Five-Year Plan period the processes of ore concentration and of reverberatory furnace-smelting will be almost completely mastered. For this reason the Plan specifies an increase in the percentage of copper to be extracted from the ore from 78 per cent in 1932 to 85 per cent in 1937 by the concentration process, and from 70 to 95 per cent by the reverberatory furnace-smelting process.

Lead: In the course of the Second Five-Year Plan period the consumption of lead by the cable industry for the manufacture of accumulators, shot and babbitt and in the production of chemical apparatus will exhibit a sharp rise.

Construction in the lead industry during this Five-Year Plan period will follow essentially the line of extending the plants already in existence as well as those nearing completion. The main efforts must be directed towards the development of mining operations and of concentration, for the capacity of the metallurgical sections of the various plants is quite considerable even now.

The Plan affects the principal enterprises as follows:

The Kazakstan Polymetal Plant at Chimkent will complete the construction of its metallurgical section in 1935; this plant is expected to produce 45,000 tons of lead in 1937. The Sikhota-Alin Combination (Far Eastern Territory) will raise its smelting from 10,000 to 20,000 tons by enlarging its mines. The production of

the Northern Caucasus Polymetal Plant will be increased from 7,000 to 12,000 tons of lead. The Altai Combination will be extensively developed. The problem of accelerating the exploitation of the rich Ridder ore base will find its solution in the course of the Second Five-Year Plan period. Altai smeltings must be brought up to 34,000 tons. Mining and, in part, concentration present the chief domains in which technique must be mastered.

Zinc: Two distillation zinc plants—the Konstantinovka and the Byelov works—were constructed in the period of the First Five-Year Plan and their operation essentially mastered during that period. The Second Five-Year Plan period will witness the starting of operations at the first electrolytic zinc plants in the U.S.S.R., erected in Orjonikidze and Chelyabinsk. The construction of a third large electrolytic zinc plant in Kemerovo has been projected. This plant will handle the zinc concentrates obtained by the selective flotation of the Altai polymetallic ores.

In 1937 the capacity of the zinc plants will reach 100,000 tons. It is expected that production at the distillation plants will be fully mastered by the end of the Five-Year Plan period, that the daily output of zinc will increase from 2.5 tons to 3.5 tons per furnace and that the percentage of extraction will rise from 65 to 83.

Aluminium: The Second Five-Year Plan provides for an output of 80,000 tons of aluminium per annum. This amount exceeds the quantity of aluminium consumed in Germany (36,400 tons), Great Britain (30,800 tons) and France (27,000 tons) in 1929.

In 1933 the non-ferrous metals industry mastered production at the Volkhov Aluminium Combination and the process of electrolysis at the Dnieper Combination. Production in the alumina plant of the Dnieper Combination was to be mastered and the work necessary for the further development of the electrolytic process completed in 1934. These two enterprises will raise the smelting of aluminium to 50,000 tons per annum, whereas their alumina plants will be able to supply only 20,000 to 25,000 tons of raw material for smelting. The Tikhvin Plant, having a capacity of 50,000 tons of aluminium oxide, will be erected to secure a supplementary supply of alumina for both of these combinations.

The discovery of huge bauxite deposits in the Urals (Nadyezhdinsk, Kamensk), which are not only richer than the Tikhvin deposits and other aluminium raw materials (nepheline, alunite, kaolin), but approximate the best French bauxites in quality,

opens up vast possibilities for developing the aluminium industry in the East. This discovery will effect a considerable reduction in the cost of the metal and in the capital investment per ton of aluminium. The construction of a powerful aluminium combination is projected in the Middle Urals (Kamensk), the first section to start operations at the end of the Five-Year Plan period with a capacity of 70,000 tons of alumina and 25,000 tons of aluminium. The alumina plant is to be enlarged in the future to 150,000 tons capacity. The electrolytic treatment of most of the Kamensk alumina is to be shifted to the region served by the Kama Hydro-Electric Plant, so that no more alumina may be electrolytically refined in Kamensk than can be done by the use of cheap electric power made available as a by-product in the generation of steam for the alumina plant (25,000 tons). Several thousand tons of aluminium will be produced as secondary metal from the smelting of scrap. The successes achieved in 1933 make it possible to contemplate the complete mastery in 1937 of the projected capacity output of both alumina and electrolytic metal.

An alumina plant of 20,000 ton capacity is to be constructed in Kandalaksha in order to create an additional source of supply of aluminium oxide, which is required not only by the aluminium industry but also in the production of abrasives. This plant will handle nepheline tailings obtained from the concentration of the Khibini apatite and nepheline ores. Hydro-electric power is the basis on which it is planned to construct another aluminium plant of 8,000 tons capacity.

Nickel: The Ufaley Nickel Combination, the first in the U.S.S.R., starts operations in 1934; the Plan contemplates the extension of this plant in the future so that it can utilize the ores of other deposits also. Prospecting for new deposits is to be vigorously pursued so that this branch of the non-ferrous metallurgical industry may be further developed.

Tin: The first mill in the U.S.S.R. for the concentration of Transbaikal tin ore was started and the first concentrates produced in 1933. The ores of Transbaikalia and Kazakstan are beginning to be gradually exploited under the Second Five-Year Plan. The experimental tin-smelting plant is being enlarged for the smelting of all these concentrates.

Particular attention is being devoted to accelerating the exploration of the Tajik Socialist Soviet Republic, where tin-bearing

regions have been discovered which promise to hold considerable deposits.

Magnesium: The Plan maps out the construction of two plants: one on the Dnieper River, the other in the Northern Urals. The magnesium chloride extracted from sea water at a factory in Perekop and from carnallite at Solikamsk will serve as raw material.

The plants now working up non-ferrous metals, particularly the Kolchugino Plant, will be developed considerably. The production of bimetallic articles, which economizes the consumption of non-ferrous metals, will be extended. This calls for a considerable enlargement and reconstruction of the plants under the control of the Bimetal Trust (Nytva, Seversk).

The Cable Industry will increase the value of its output from 171,000,000 to 400,000,000 rubles or 2.3 times. The output of electrical communication supplies is to show a considerable increase in value (from 29,000,000 to 95,000,000 rubles). This task calls for the construction of a powerful new plant to manufacture telephone cables (in the Moscow Region) in addition to equipping the section of the Northern Cable Works recently erected. Furthermore, a new power cable department is to be erected at the Moscow Cable Works.

The aluminium industry was created in the course of the First Five-Year Plan period. The Second Five-Year Plan period is witnessing the establishment of nickel, tin, magnesium and electrolytic zinc manufacturing. The hydro-metallurgic method of zinc extraction will be applied for the first time. The modern method of reverberatory furnace smelting of metal from concentrates, obtained by dressing low-grade ores, will finally take firm hold in the copper-smelting industry. The selective and collective flotation methods will be applied on a large scale. The exhaust gases from the furnaces and the tailings from concentration will be utilized. The mechanization of both underground and surface work in the copper-mining industry will be carried out on an extensive scale. The production of aluminium alloys, of bimetals, of high voltage oil-filled cables and of long-distance telephone cables will be developed.

The reconstruction of the non-ferrous metallurgical industry and the mastering of the most advanced methods of smelting non-ferrous metals will ensure the fulfilment of the tasks imposed upon this industry by the Second Five-Year Plan.

RARE ELEMENTS

THE reconstruction of national economy on the basis of introducing the latest technical achievements calls for the establishment of the production of new special and high-grade metals, particularly such as require the extensive application of rare metals hitherto never produced in the Soviet Union, or else produced in insufficient quantities.

The rare elements industry originated and started to develop only during the period of the First Five-Year Plan. In the course of the Second Five-Year Plan period the rare elements industry must greatly increase the production of the most important metals and their combinations, increasing the value of its output 3.8 times (from 17,600,000 rubles in 1932 to 67,400,000 rubles in 1937).

It is necessary to develop scientific research and geological prospecting work on a large scale. The study of the technical properties and the spheres of application of rare metals must be particularly improved in order to introduce the use of those metals which have an adequate raw material base (lithium, zirconium, cerium and possibly molybdenum) and to substitute them for metals whose sources of raw material are not yet sufficiently explored.

It is the task of the Second Five-Year Plan to perfect the technology of producing rare metals from domestic raw materials: rare earths (cerium, thorium) from logarites, zirconium from evanolites, vanadium from the Kerch slags and titano-magnetites and molybdenum from copper-molybdenum ores, the extraction of beryllium, etc.

The high value and scarcity of rare elements assign to industry the urgent task of combating losses in the concentration process (too low a percentage of metal extraction from the ore), in working up the ore (waste), and in the improper use of tools containing rare elements (cutters made of high-speed steel).

The special features which attach to deposits of rare elements of the fine pegmatite or pneumatic type make it necessary to

develop new methods for locating, studying and exploiting them (setting up small plants, temporary and mobile in character).

The development of the raw material base must follow the line of prospecting for new special rare metal deposits and of studying and mastering the industrial production of the complex deposits, where the rare elements are obtained as by-products (tungsten and bismuth in tin and gold deposits, molybdenum in copper ores, bismuth in polymetal deposits, cobalt in iron and nickel deposits, vanadium in the titano-magnetites and nephelines, and so forth).

Capital investments in the rare metals industry will total 175,000,000 rubles in the course of the five years, as against 32,000,000 rubles expended for the same purpose during the First Five-Year Plan period—a more than 5-fold increase.

In the course of the second quinquennial period the rare metals industry must master the production of the following metals and alloys so that they may be produced on a scale adequate to satisfy the requirements of national economy: decarbonizing manganese and chromium, titanium alloy, hard and super-hard alloys, beryllium, lithium, vanadium, cerium, zirconium, antimony and mercury.

The Plan specifies that the exploitation of at least 8 large new tungsten deposits be mastered, particularly the Kazakstan and Altai deposits. Small deposits must be exploited by organizing mobile concentration mills and by individual miners working on their own.

In the production of molybdenum, the exploitation of the new rich Korob deposits in Transcaucasia and the Umaltins deposits in the Far East is to be started.

The antimony and mercury schedule calls for a doubling of the mercury output in Nikitovka and necessitates mastering the exploitation of the rich complex antimony and mercury deposits in Ferghana, of the antimony deposits in Central Asia (Turgai, Kadam Jai) and elsewhere in the Union, and the development of small, individual mercury deposits.

It is necessary to start the mining of bismuth in Central Asia and the extraction of this metal from tungsten ores.

The processes of extracting and working up Khibini ores for the production of rare earths and of zirconium are to be mastered.

Cobalt is to be produced from the Dashkesan and other deposits. In order to extend the raw material base it is necessary, in addition to studying the old districts, to do much exploring and prospecting in the new districts in which deposits were discovered during the period of the First Five-Year Plan: Kazakstan and Altai for tungsten; the Kola Peninsula, the Caucasus and Central Asia for molybdenum; West Siberia and Central Asia for beryllium; the Urals and Central Asia for cobalt.

CHEMICAL INDUSTRY

THE development of the chemical industry and the introduction of chemical methods and processes of production in national economy are absolute prerequisites for the completion of the country's technical reconstruction, and are among the basic factors determining the development of the productive forces of national economy and the reinforcement of the defensive strength of the Soviet Union.

The Seventeenth Congress of the Communist Party made it incumbent upon the country "to attain decisive advances in the development of the chemical industry, ensuring the extensive introduction of chemical methods and processes in all branches of national economy and the reinforcement of the defensive strength of the country."

The program specifies the following gross output of chemicals in 1926-27 prices:

	1932	1937	1937 in % of 1932
		(million rubles)	
1. Total chemical industry	1,965	5,547	282.2
of which:			
Chemical industry planned by the P.C. of Heavy Industry	1,497	4,099	273.8
of which:			
Basic branches of the heavy chemical industry inclusive of the extraction of mined chemical raw materials .	201	1,085	539.8
2. Coke	163	422	259.0

The production of the chemical industry as a whole will increase 2.8 times in the course of the five years, while the production of the basic branches of the heavy chemical industry will grow 5.4 times.

The latest, most advanced technological processes (reactions in gas phases, development of catalysis under high pressures and temperatures, application of biochemical processes, use of oxygen and hydrogen in the technological process for oxidizing and restoring reactions, large-scale development of electrochemical and

electrothermic methods) are being introduced in the industry during the Second Five-Year Plan period. The manifold development of combining the chemical industry with other industries will raise the concentration of production to a higher stage and will make possible the maximum utilization of raw materials.

Thus, powerful combinations embracing the metallurgical, coke and chemical industries will be created in the course of the five-year period. These combinations will be outfitted for the complete chemical utilization of by-products, producing ammonia, methanol, solvents, etc., from by-products of coking and from blast furnace and coke gases. Similar combinations are being created in the oil industry on the principle of utilizing the waste gases of refineries. Power and chemical combinations are under construction designed to burn peat, oil shale, lignite, etc., and to produce gas, liquid fuel, phenols, cresols, etc.

In the chemical industry proper the production of the basic branches of the heavy chemical industry and of aniline dyes is being closely interwoven into a single cycle of operations. The aniline dye industry in turn is being linked to the production of pharmaceutical products and plastic materials. The plants in the basic branches of the heavy chemical industry furnish sulphuric acid, etc., directly to the dye industry, which in turn supplies the former with its waste acid to be used for fertilizers. This procedure does away with the regeneration of acids which is very costly and involves great waste of raw materials. Similarly the plants in the basic branches of the heavy chemical industry receive the hydrochloric acid from chlorination plants: gypsum, sulphates, bisulphates and other miscellaneous solid and liquid waste products. Thus the different kinds of raw materials which used to be wasted will be fully utilized.

One of the most important tasks to be accomplished by the chemical industry consists in effecting a 10-fold increase in the output of fertilizers in the course of the Second Five-Year Plan period.

In the production of phosphate fertilizers, the Second Five-Year Plan contemplates the organization of the production of new kinds of concentrated fertilizers, such as ammonium phosphate, double superphosphates, precipitate and thermophosphates, in contradistinction to the First Five-Year Plan under which nothing but superphosphates (614,000 tons in 1932) were produced.

The following are the quantities of soluble phosphates to be

produced in 1937: 1,475,000 tons of superphosphate, 185,000 tons of precipitate, 150,000 tons of ammonium phosphate, 35,000 tons of triple superphosphates and 70,000 tons of thermophosphates. Translated into fertilizer content (P_2O_5) the total output in 1937 will be equal to 421,000 tons of P_2O_5, 64.4 per cent of which will be the product of now existing plants, while the remaining 35.6 per cent will be manufactured by newly built plants. The average P_2O_5 content per ton of phosphate fertilizer will be 220 kg. in 1937 as compared with 138 kg. in 1932.

The level of output of phosphate fertilizers in the U.S.S.R. will exceed the 1929 production level of all the capitalist countries with the exception of the United States which produced 3,749,000 tons.

Nitrogen fertilizer production will have to master, during the Second Five-Year Plan period, the technique of all the most advanced and most perfected methods of production. On the whole, this branch of the chemical industry will show considerable growth compared with 1932.

In that year the production of synthetic ammonia was based on the extraction of hydrogen—25 per cent from the conversion of water gas and 75 per cent by the iron and steam method.

In 1937 the conversion method will account for 44.8 per cent, while the low cooling method (to be introduced in the course of the Second Five-Year Plan period) will yield 35.6 per cent, the steam-oxygen method—7 per cent and the electrolytic decomposition of water—8 per cent. Only 4.6 per cent of the total production of synthetic ammonia will be accounted for by the obsolete and costly iron-steam method.

The quality of nitrogen fertilizers is being greatly improved during the Second Five-Year Plan period. The proportion of sulphate of ammonia, the least valuable fertilizer, was 62 per cent in 1932. In 1937 Soviet agriculture will be supplied with such nitrogen fertilizers as mined saltpetre and Leuna saltpetre, while the proportion of sulphate of ammonia in the total production of nitrogen fertilizers will be considerably reduced.

Great strides are being made in the manufacture of *potassium fertilizers* during the Second Five-Year Plan period. The first potassium mine, exploitation of which began in 1933, is planned to produce 1,500,000 tons of raw salt per annum. The construction of the second mine is to be completed by the end of this period, at which time the aggregate capacity of the mines will reach 3,000,-

000 tons. In 1937 the output of potassium fertilizers will reach the level achieved by France in 1929, and will be equal to 25 to 28 per cent of Germany's output in that year.

The construction of the carnallite and magnesium combinations will be fully developed by the end of the Second Five-Year Plan period.

Sulphuric acid industry: at the end of the First Five-Year Plan period the output of sulphuric acid amounted to 495,000 tons; this figure will be raised to 2,080,000 tons in 1937.

Essential improvements in the utilization of the available raw material resources for the production of sulphuric acid have been projected under the Second Five-Year Plan. Thus, the proportion of common pyrites in the total quantity of raw material used for the production of sulphuric acid was 71.3 per cent in 1932, but will drop to 14.5 per cent in 1937. On the other hand the proportion of flotation tailings in the raw material is rising from 19.1 per cent in 1932 to 46.3 per cent in 1937. The utilization of waste gas from copper smelters will acquire considerable importance, its share in the total bulk of raw materials increasing from 3.5 per cent in 1932 to 23.1 per cent in 1937.

According to the Plan, advanced technical methods in the production of sulphuric acid will be greatly developed. Thus, while the production of sulphuric acid in chamber installations will show an absolute growth in the course of the Second Five-Year Plan period (through intensification), the relative importance of these installations is receding from 36.3 per cent in 1932 to 10 per cent in 1937. It is the tower installations that will retain their leading position during the Second Five-Year Plan period (accounting for 39.6 per cent at the end of the First Five-Year Plan period and 66.1 per cent at the end of the Second Five-Year Plan period).

The projected technical improvements denote an increase in the yield of sulphuric acid per cubic metre. In 1932 the yield of acid in tower installations amounted to 16.5 tons on the average, in 1937 it will be 25.6 tons.

The production of soda ash is increasing during these five years from 285,000 tons to 700,000 tons.

The Donetz Basin and the northwestern Urals, hitherto the main districts producing soda products, will be joined during the Second Five-Year Plan period by the new district of Karabugaz.

The production of salts will develop rapidly in connection with

the output of a number of products never produced heretofore in the Union, for instance, various kinds of insecticides and fungicides.

The completion of the technical reconstruction of national economy necessitates a forced rate of development of new manufactures and new branches of the chemical industry.

The new *fuel-chemical industry* is being considerably developed in the course of the Second Five-Year Plan period. The gasification of peat is being organized as well as the partial (to the extent of 50 per cent) treatment of the tar collected in this process. The result will be thousands of tons of most valuable products (mineral wax, phenols and cresols, paraffin, neutral oils, etc.) including motor fuel. The development of oil shale extraction will be paralleled by its gasification and the complete utilization of gas and all waste products. But the Second Five-Year Plan will lay only the foundation of this industry. The chemical treatment of the Chelyabinsk lignites and of the sapropelites is being organized. The construction of a number of plants in West Siberia for the production of liquid fuel from sapropelites is a most important step in the sphere of fuel chemistry. For the end of the period in question the development of steam-phase oil cracking has been projected, a process which will serve as the basis for a new branch of oil chemistry.

The gas generators projected by the Plan for huge industrial plants as well as the existing gas generators which work on peat will yield about 150,000 to 160,000 tons of peat tar. For the purpose of developing the chemical distillation of the latter, new plants having a total capacity of 62,900 tons of distilled peat tar will be constructed. The plant to be erected at Redkino in the Moscow Region and the peat-tar chemical distillation plant attached to the glass works at Gus Khrustalny in the Ivanovo Region are the first to be built.

The construction of two experimental oil-shale refineries in Leningrad and Kashpira are to be finished early in the Second Five-Year Plan period.

One of the tasks included in the Second Five-Year Plan is the adaptation of the Leningrad enterprises to the use of local fuel. The available peat and oil-shale resources make it possible to map out the handling of 700,000 tons of oil shale. The gas is to be pipe-lined to Leningrad. In addition it is intended to construct an oil-shale chemical combination with a capacity of 1,000,000

tons of distilled oil shale in the Chuvash Autonomous Socialist Soviet Republic.

The aim of lignite chemistry is to initiate the distillation of tar during the second quinquennial period, 40,000 tons of which are to be obtained in the gasification of the Chelyabinsk coal.

The construction of the experimental plant for the refining of sapropelites is to be completed early in the Second Five-Year Plan period.

The two small plants built at Ostashkov and in the White Russian Socialist Soviet Republic will take care of the utilization of sapropelites (slime of fresh water lakes and swamps).

The manufacture of a number of *organic synthetic products* such as acetone, acetic acid, methanol and the higher alcohols represents an absolutely new industry to be created in the course of the Second Five-Year Plan period. The scarcity of these items at present handicaps the development of the following industries: the manufacture of motion picture and photographic films, organic dyes, plastic materials, chemical and pharmaceutical products, solvents and varnishes for the automobile and aviation industry, etc. The wholesale shift in the manufacture of these products from the dry distillation of wood to synthetic methods will enable the Soviet Union to obtain a sufficient quantity of these products in a comparatively short time. This will effect a considerable saving of labour power, capital investment and operating expenses. The object of the projected industrial process is to obtain methyl alcohol from the synthesis of carbon monoxide and hydrogen derived from water and coke gases, acetic acid from calcium carbide through acetylene and acetaldehyde, also by utilizing the waste acetaldehyde from synthetic rubber plants and ethyl alcohol.

In addition to the above manufactures the organic synthetic products industry is organizing the output of the higher alcohols in the course of the Second Five-Year Plan period.

The list of other products to be developed includes compound ethers, acetic and other acids, and organic chlorine products, which are of great importance to national economy as solvents for varnishes, wax, fats, etc.

The basic problem of the dye industry during the Second Five-Year Plan period consists in inaugurating the manufacture of more high-grade products (indigo, indanthrene, triphenylmethane dyes), and in developing greater variety in other non-dye industries, such as the manufacture of rubber accelerators and anti-

oxidizers, artificial tannins, raw material for photography and pharmaceutical chemicals. The Plan devotes special attention to the creation of an extensive supply base of semi-finished products for these industries.

The aniline dye industry will be developed in a number of new regions which, in addition to the Ukraine, will include the Urals and West Siberia, where this industry can be closely connected with the manufacture of the basic branches of the heavy chemical industry. In 1937 the output of this industry will represent a value of 300,000,000 rubles.

The paint and varnish industry will develop on the basis of combining its enterprises with those of other industries, particularly those of the non-ferrous metals industry. This contemplated practice predetermines the geographic distribution of the paint and varnish industry, which is being shifted eastwards under the Second Five-Year Plan (Urals and West Siberia). In 1937 the output of this industry will amount to 185,000,000 rubles as against 103,000,000 rubles in 1932.

Plastic materials represent an item of great importance in national economy.

The program for the Second Five-Year Plan period provides for an increased output of the most essential plastic materials and of articles manufactured therefrom:

	1932	1937
	(thousand tons)	
Resol powder	0,47	3.9
Asphalt-pitch materials	0.08	5.5
Articles made of plastic materials	0.69	13.65

The plastic materials industry, which obtains its raw materials from the aniline-dye, coke-chemical and other industries, will effect a 12-fold increase in the output of certain types of manufactures during the Second Five-Year Plan period. At the same time the production of high-grade plastic materials of great technical importance (phenol, formaldehyde, vinyl, cellulose ethers, carbamide-aldehyde, asphalt-pitch and other materials) will be inaugurated. The industry will thus be enabled to start large-scale production of parts for the electro-technical, automobile, aviation, machine-tool and other industries, in addition to manufacturing articles for general consumption (celluloid toys, cigarette cases, combs, galalith penholders and pencils).

The rubber and asbestos industry ushered in the Second Five-

Year Plan period with a number of reconstructed old plants (the Red Triangle, Red Hero, Rubber and Conductor Plants) and a number of completed shops of the Yaroslavl Rubber Combination.

During the First Five-Year Plan period the rubber and asbestos industry imported its rubber, only a few articles having been manufactured from Soviet synthetic and natural rubber, and even these merely by way of experiment. In the Second Five-Year Plan period, the Soviet rubber plants obtain their rubber supplies in the main from domestic sources.

The output of tyres is being increased nearly 5.5-fold, reaching a total of 3,000,000 in 1937. A great deal of attention must be paid under the Second Five-Year Plan to the production of technical articles made of rubber.

The output of rubber footwear and soles is increasing as follows:

	1932	1937
Rubber footwear (million pairs) . .	64.8	100.0
Rubber soles (thousand tons) . . .	14.0	30.0

In 1937 the output of the rubber and asbestos industry will be valued at 1,337,000,000 rubles, an increase of 134 per cent as compared with 1932.

The synthetic rubber industry is the youngest branch of the chemical industry of the Union. Two synthetic rubber plants were added to the list of operating plants on the very eve of the Second Five-Year Plan period. The first year of the Second Five-Year Plan period (1933) was the first year of industrial exploitation of these plants.

The Second Five-Year Plan provides for the construction of the second and third sections of 3 existing plants, as well as of new synthetic rubber plants.

The high value of the by-products derived from the production of synthetic rubber by using Academician Lebedev's process makes it urgent to establish departments in which these by-products can be worked up into valuable chemicals (ethyl-acetate, butyl and propyl alcohol, etc.). In the course of the Second Five-Year Plan period such departments will be established in all operating plants.

The main object in developing the *pharmaceutical industry* in the Second Five-Year Plan period is to supply as far as possible the quantity of drugs, reagents and technical preparations required by the U.S.S.R. A number of new products involving the application

of the latest achievements of Soviet and foreign science and engineering are scheduled to be manufactured. In the course of the Second Five-Year Plan period no less than 50 imported preparations will be replaced by corresponding products of domestic origin.

Considerable success has recently attended the production of iodine from mineral drill-well waters. As a result the large-scale production of iodine is to be organized in a relatively short period of time.

The program projects the construction of several plants in the districts adjacent to the Caspian Sea, inasmuch as they are the best explored districts as regards the industrial production of iodine. It is intended to raise the output of technical iodine to 153 tons (as against 57.4 tons in 1932).

The chemical distillation of wood aims to utilize the vast pulp resources which at present are lost in the timber industry as unused by-products or production waste. This raw material must supply the basis on which are to be established the wood-plastic materials industry and the hydrolysis of wood pulp. The latter, an absolutely new branch of industry of vast importance with a great future before it, produces ethyl alcohol and concentrated forage. A large quantity of the former will be produced by this process in 1937.

The charcoal industry in the Urals, which is not operated rationally at present, must introduce rational methods and stop the loss of its by-products.

The manufacture of rosin and turpentine is being developed on a large scale both through rationalizing the process of extraction of crude turpentine from pine trees and the distillation of stump pitch.

The Coke-Chemical Industry: to ensure the coke supply of the iron and steel industry it is necessary to master capacity operation of the coke ovens built under the First Five-Year Plan, and to build new ovens in the vicinity of the new iron and steel works now in the course of construction.

The program provides for the construction of new coke ovens in the South, at Kramatorsk and Stalino-Makeyevka, each to have a capacity of 1,300,000 tons. These ovens are to be built in addition to the completion of the Zaporozhye, Krivoy Rog and Mariupol coke ovens, representing a total capacity of 3,900,000 tons of coke per annum.

In the East building operations proceed according to the following specifications:

a) The Magnitogorsk giant of the coke industry, which represents a total capacity of over 3,000,000 tons of coke per annum, will be completed;

b) The construction of the Nizhni Tagil (1,950,000 tons capacity), Bakal, Kuznetsk (second section), Khalilovo and Far East coke ovens having a total capacity of 5,850,000 tons will be either commenced or developed.

Following are the outstanding features of the various projects contemplated by the Second Five-Year Plan in the coke-chemical industry:

a) Construction of huge coke installations;

b) Introduction of high-speed ovens with a coking period of from 16 to 18 hours and temperatures of 1,250-1,500° C.

The Second Five-Year Plan provides for a considerable improvement in the technique of coking. The process will be perfected along the following lines:

a) Improvement in quality of coke by reducing the ash, sulphur, phosphorus and moisture content and increasing the firmness of the coke;

b) Rational utilization of coke gas for the open-hearth furnace, rolling and other shops at the metallurgical plants, for the production of synthetic ammonia (at the Gorlovka, Magnitogorsk, Kuznetsk and other plants) as well as for the production of synthetic products of methanol, alcohols, solvents, etc.;

c) All coking by-products at the most important coke plants must be completely worked up chemically so that they may yield the most refined products;

d) Improvement in the process of obtaining chemical products and raising their quality;

e) Organization of sulphur extraction from coke gas, etc.;

f) Experimental use of oxygen in the coking process.

When the lag of the chemical industry behind the tempo of development of national economy as a whole will have been overcome the industry will be assured of a highly important place in the complete utilization of all kinds of raw materials, maximum utilization of waste products, acceleration of technological processes in a number of industries, considerable improvement in the yield of Soviet harvests and reinforcement of the defensive strength of the country.

BUILDING MATERIALS

THE scope and the rates of development of the building-materials industry under the Second Five-Year Plan have been dictated by the consideration that the supply of building materials required by national economy for structural and operating purposes must be fully ensured.

The volume of output of the building materials industry within the system of the People's Commissariat of Heavy Industry is increasing from 494,500,000 rubles (in 1926-27 prices) in 1932 to 1,190,000,000 rubles in 1937, or 240.7 per cent of the 1932 output.

The increase in the individual branches of the building materials industry may be seen from the following figures:

Physical Output of the Principal Building Materials

	1932	1937
	(in thousand tons)	
Cement	3,481	7,500
Fire clay (chamotte)	793	2,300
Dinas clay	178	718
Asbestos	60	200
Brick (entire output of country in millions)	4,736	8,000
of which:		
P. C. of Heavy Industry	2,142	3,575

The production of various kinds of building materials (principally from local raw materials) by other branches of national economy on construction jobs and by co-operative, State and social organizations amounted to approximately 216,000,000 rubles in 1932. For 1937 the output of these producers has been scheduled to reach a value of 463,000,000 rubles, or double the 1932 value. In 1937 more than half of all the local building materials required for the fulfilment of the construction program of national economy will be produced outside the system of the People's Commissariat of Heavy Industry.

The total production of building materials is growing from 711,000,000 rubles in 1932 to 1,653,000,000 rubles in 1937, an

increase of 132.5 per cent. This volume of output will fully cover the building material requirements under the Second Five-Year Plan.

According to the Plan the total capital investment in the building materials industry under the People's Commissariat of Heavy Industry will amount to 1,501,000,000 rubles during the five years, including 352,000,000 rubles for the cement industry, 600,000,000 rubles for the refractory industry and 152,000,000 rubles for the asbestos and slate industry.

Cement industry: the average annual capacity of the cement industry in the period of the Second Five-Year Plan may be seen from the following figures:

	1933	1937
	(million barrels)	
a) Plants in operation	31.6	34.0
b) New plants and units	1.1	16.2
Total	32.7	50.2
c) Scheduled production	17.7	48.3

The above data show that the cement industry will have a considerable marginal capacity during the Second Five-Year Plan period. Construction on most of the new works which will begin operations before 1937 was started in the course of the First Five-Year Plan period.

The sum of 90,000,000 rubles, or 25.6 per cent of the total capital to be invested in the cement industry, has been assigned for new construction to be started in the course of the Second Five-Year Plan period.

Cement production is growing at a faster pace than the building industry proper. This is due to the fact that the program of the Second Five-Year Plan period pursues the policy of eliminating the use of less efficient binding materials (lime) and of increasing the relative consumption of cement in building. This factor is also one of the prerequisites for building cost reduction.

The total amount of Portland cement scheduled to be produced in 1937 is 7,500,000 tons as against 3,481,000 tons in 1932.

The following problems must be solved in order that the development of cement production in the Second Five-Year Plan period may be accelerated:

1. Mechanization of quarries and of intra-plant transportation facilities, as well as of other laborious processes;

2. A radical renewal of the worn-out equipment constituting the fixed capital of the operating plants;

3. The carrying into effect of rationalization measures, in particular the introduction of hydraulic lime additions, pulverization of silt, the introduction of slag additions and a general improvement in the grades produced (shift to the preferential production of the "OO" and "OOO" brands of cement).

Of particular importance is the adoption of paper sacks, as this is a decisive factor in reducing the cost of cement. The industrial basis for making this change was created in the paper industry in the course of the First Five-Year Plan period. The importance of this measure may be gauged from the fact that if the program for the production of paper sacks is fulfilled, a 5 per cent reduction in the cost of cement will be achieved in 1937.

The development of the *refractory industry* under the Second Five-Year Plan is characterized by an increase in the output of fire clay from 793,000 tons to 2,300,000 tons, or to 290 per cent of the former figure; in the output of Dinas clay—from 178,000 tons to 718,000 tons—a 4-fold increase which will fully cover the requirements of the iron and steel and the coke industries. In 1932 the iron and steel industry consumed 53 per cent of the fire clay and 79 per cent of the Dinas clay produced. In 1937 the proportion will be 48 and 57 per cent respectively. In the course of the second quinquennial period the coke industry, which until recently used imported Dinas clay, must be fully supplied with domestic Dinas clay only. The same principle applies to a number of other industries (the glass industry, the non-ferrous smelting industry, the cement industry) which require high-grade refractory materials.

The greater part of the production program for refractory materials will be executed by the special refractory industry, while a minor portion will be filled by the refractory shops of the iron and steel industry itself. The refractory industry, which in 1932 produced 24.6 per cent of the total fire clay output, will produce 29.2 per cent in 1937; its production figures for Dinas clay will be 37.0 and 36.7 per cent respectively. Furthermore, the enterprises of the local industries will contribute to the total output of refractory materials.

It is planned to invest 600,000,000 rubles during the period of the Second Five-Year Plan in construction work related to the special refractory industry.

The sum of 299,000,000 rubles, or 69 per cent of the total in-

vestment, has been allotted for the construction of plants to be begun during the Second Five-Year Plan period.

The Plan provides for the building of plants at Chelyabinsk and Zaporozhye, which are to produce special high-grade refractory materials for particularly important sections of metallurgical furnaces, for electric furnaces, and for the cement and glass industries.

A new magnesite plant with a capacity of 100,000 tons of magnesite brick and 120,000 tons of smelting powder is being built in the Urals and will begin operations in 1937.

In that year, 41 per cent of the output of fire clay and 80 per cent of the total output of Dinas clay will be manufactured by the new special refractory works.

Under the Second Five-Year Plan the construction of refractory shops will likewise proceed on a large scale in the iron and steel plants.

Parallel with the completion of the construction of refractory shops of the Zaporozhye and Tagil Combinations, Dinas clay departments will be built at the Bakal, Khalilovo, Krivoy Rog, Kuznetsk Basin and other metallurgical plants. These new shops are in effect vast regional plants which are designed to supply not only the respective metallurgical combinations but also all consumers of refractory materials in the dependent districts.

A considerable proportion of capital investments in construction under the new program and in smaller items of construction will be allotted for the development of raw material resources. The concentration of raw materials, the mechanization of production, the removal of raw materials by excavators and their transportation by motor trucks, suspended and ordinary railways must be organized in the course of the Second Five-Year Plan period. In the Urals, where almost one-third of the total capital allotted to the refractory industry will be invested, the need for developing the raw material base for the production of refractory materials is especially urgent.

In the course of the Second Five-Year Plan period the refractory industry must face the very important problem of improving the quality of its products. The solution lies in the standardization and specialization of refractory products, in the drastic reduction of spoilage, in strict adherence to present standards for thermal, chemical and mechanical properties of fire-proof articles, in increasing the proportion of the so-called special shapes and

complex pattern products, the most important category in the refractory industry, inasmuch as these products are used for blast and open-hearth furnaces, coke batteries, boiler works, powerful electric stations, cracking plants, etc.

Asbestos-slate industry: the development of the automobile, tractor, aviation, rubber (among others, the Yaroslavl Rubber and Asbestos Combination), asbestos products, artificial slate, asbestos-cement pipe and heat insulating material industries entails a considerable increase in the demand for asbestos.

The output of the asbestos-slate industry is increasing as follows: sorted asbestos—from 60,000 tons in 1932 to 200,000 tons in 1937; slate—from 114,500,000 shingles to 220,000,000 shingles; asbestos-cement pipes—from 35 km. to 2,700 km.; asbestos millboard—from 2,200 tons to 8,000 tons.

Local building materials industry: in accordance with the schedule for new construction, the demand for wall materials for 1937 is estimated at from 11,000,000,000 to 11,500,000,000 pieces (in terms of standard bricks) as against 5,800,000,000 in 1932. This requirement is to be covered by the production of 8,000,000,000 bricks of all types, and 3,200,000,000 units (in terms of standard bricks) of new building materials. In 1937 new wall materials, in the main all kinds of artificial stone, large pre-cast blocks, natural stone (such as tufa and shell limestone) will take up 28.5 per cent on the wall-material balance sheet as against 16.5 per cent in 1932. The 1937 output of new wall materials throughout the entire national economy will constitute 329 per cent of the 1932 output. The output of the brick industry will increase by 68.9 per cent during the Five-Year Plan period, that of the enterprises under the People's Commissariat of Heavy Industry—by 67 per cent. The Second Five-Year Plan makes it necessary to increase mechanization in the pits. The moulding, burning and drying processes in the enterprises of the brick industry must also be mechanized to a greater extent, and the brick industry be reorganized to work all year round by building sheds for artificial drying.

The Plan provides for the following capital investments in the wall-material industry under the People's Commissariat of Heavy Industry: 158,200,000 rubles for the brick and ceramic industry and 29,500,000 rubles for the production of new materials. Of this total, 81,400,000 rubles are intended for new construction, inclusive of 18,000,000 rubles for finishing the construction of the brick

works begun before 1933 and 46,600,000 rubles for building new factories in national districts, chiefly Yakutia, the Mari Region, East Siberia, the Far Eastern Territory, Murmansk, Kazakstan and Central Asia.

Binding materials: the production of local binding materials (lime, chalk, plaster of Paris, tripoli and other cements) is scheduled to show the following figures: in 1937—4,850,000 tons of lime as against 2,986,000 tons in 1932; 1,200,000 tons of plaster of Paris as against 475,000 tons in 1932.

In 1937 the industries under the Commissariat of Heavy Industry will have to produce 1,500,000 tons of lime as against 1,326,000 tons in 1932, *i.e.*, 113 per cent of the 1932 output, and 530,000 tons of plaster of Paris as against 252,000 tons in 1932.

New regions (the Urals, East Siberia, Transcaucasia and Central Asia) are being opened up for the production of plaster of Paris.

Roofing materials: in 1932 the production of roofing materials amounted to 55,800,000 sq. metres. The volume of production for 1937 has been fixed at 117,700,000 sq. metres. Concomitantly with this growth of production, major changes in the proportion of the various kinds of roofing materials are contemplated.

ROOFING MATERIALS
(in % of total output)

Years	Tar paper	Rubberoid	Natural slate	Tiles	Artificial slate	Sheet iron	Misc.	Total
1932	44.6	7.1	0.6	5.6	22.2	7.2	12.7	100.0
1937	40.5	16.5	1.2	10.6	22.1	7.4	1.7	100.0

During the Second Five-Year Plan period roll roofing will continue to predominate. This makes it particularly necessary to improve its quality. The projected output of tar paper roofing will be 6,600,000 rolls in 1937 as against 3,474,000 rolls in 1932 inclusive of 5,200,000 rolls produced by enterprises under the People's Commissariat of Heavy Industry; of rubberoid—1,800,000 rolls as against 397,000 rolls in 1932.

Glass and earthenware industry: the Second Five-Year Plan specifies that the demand for window glass, porcelain and glassware in general use must be fully met by developing the mechanized production of these manufactures.

The output of glassware is increasing in value from 191,120,000 rubles in 1932 (in fixed 1926-27 prices) to 537,000,000 rubles in

1937, or by 180.9 per cent. In 1937, 75 per cent of the total production will be mechanized as against 35 per cent in 1932.

The output of the crockery and porcelain industry will total 180,000 tons in 1937 as against 83,600 tons in 1932.

While the average growth of glassware production as a whole will reach 274 per cent in 1937, the most important item for general consumption—drinking glasses—will in 1937 show an increase to almost 400 per cent of the 1932 output, as the Plan provides for the manufacture of 340,000,000 glasses, over 300,000,000 of which will be blown glasses, as against 85,000,000 for all glasses in 1932.

In the course of the Second Five-Year Plan period the press machines will be replaced by press-blowing machines in the manufacture of glassware of general consumption. The mechanized mass production of articles for industrial purposes—containers for canned goods, bottles, drug containers, perfume bottles, etc,—is based, in the period of the Second Five-Year Plan, on mastering the technique of the existing machinery, which includes such makes as Lynch, Roirant, Owens and Miller.

By the end of the Second Five-Year Plan period, 83 per cent of the glass industry will be mechanized.

One of the basic problems in the growth of the glass industry, which must be solved in the course of the Second Five-Year Plan period, is the maximum utilization of the furnaces at plants in operation, primarily the mechanized works manufacturing window glass. This must be achieved by improved utilization of the machines and by using refractory materials of a higher quality. The introduction of new categories of raw material—bauxites, diaspores, corundums, andalusites, cyanites, etc., the production of exceptionally strong mullite rods by the electric smelting process, fire-proof plastering, etc.—will make it possible to complete reconstruction in the thermotechnical field and in the furnace departments of the Soviet glass industry in the course of the Second Five-Year Plan period.

Another highly important problem which will find its solution in the course of the Second Five-Year Plan period is the mass production of new types of manufactures, such as Fresnel lenses for railroad automatic block signals, clinker for high pressure steam boilers, unbreakable Triplex glass for the automobile and aviation industries, chemical and heat-proof glass, ultra-violet glass, ship glass and other kinds of special and technical glass.

The fulfilment of the projected program of the glass industry

as scheduled by the Second Five-Year Plan hinges on the commencement of production in the plants now in the course of construction at Homel, Gorky, Verkhnye-Udinsk, Lissichansk and Orjonikidze. Furthermore, it is planned to build a number of new works and to reconstruct the present works. Capital investments within the systems of the People's Commissariat of Heavy Industry and of Light Industry total 561,800,000 rubles for the glass industry and 290,400,000 rubles for the earthenware industry. It is planned to complete the building of new units which represent a total output capacity of about 55,000,000 sq. metres of window glass, and to finish the reconstruction of the existing works. Furthermore, the industry will begin to build a number of new glass works having a capacity of 130,000 tons and 5 earthenware, including porcelain, works having a capacity of 120,000 tons. In addition, 15 glass and 8 porcelain and crockery works are being reconstructed or enlarged. Glass and earthenware works will be built in the following new regions: Central Asia, East Siberia, West Siberia, the Urals, the Mari Region, Transcaucasia, Kazakstan, the Far Eastern Territory, Yakutia, the Central Black Soil Region, etc.

According to the provisions of the Second Five-Year Plan, the plants manufacturing building materials will burn considerably less wood and long-haul fuel than formerly, using local fuel such as peat and lignite instead. The proportion of wood used as fuel in the glass industry will drop to 30 per cent in 1937 as compared with 50 per cent in 1932, while the proportion of peat will rise to 25 per cent as against 9 per cent for the same years. At the same time the specific rates of fuel consumption are to be reduced as follows: in glass production—from 2.28 tons of conventional fuel per ton of output in 1932 to only 1.34 tons in 1937; in earthenware production—from 5-6 tons in 1932 to 2.6 tons in 1937. The glass industry must devise a better gas generation system, which on the one hand will make it possible to increase the heat content of the gas, and on the other to increase the output of glass per square metre of furnace bed area. In the earthenware industry it is projected to shift from the intermittent round hearths now in use which consume a considerable amount of fuel, to the continuously burning tunnel furnaces in which the fuel consumption is much smaller. Furthermore, both in the glass and in the porcelain and crockery industries, the waste gases which hitherto have never been used to any considerable extent will now

be used for auxiliary and subsidiary machine units (drying of clay, sand, lime, etc.).

No less important for the glass industry, and especially for the earthenware industry, in the period of the Second Five-Year Plan is the question of raw materials. In addition to developing geological exploration, the earthenware industry will have to master the technique of using substitutes consisting of local clay, sand and pegmatite.

The fundamental task of the building materials industry—the material basis on which the fulfilment of the stupendous construction program of the second quinquennial period depends—consists in waging a determined struggle to master the technique of producing new building materials, to master the technique of the newly created enterprises.

TIMBER INDUSTRY

IN the course of the Second Five-Year Plan period the total output of the Soviet Union's timber industry is growing in value (in 1926-27 prices) from 3,186,700,000 rubles in 1932 to 5,888,100,000 rubles in 1937, or 84.7 per cent. The following increases in the output of the main branches of this industry have been outlined: timber cutting—from 1,559,500,000 rubles to 2,587,100,000 rubles, or 65.9 per cent; wood-working—from 1,272,800,000 rubles to 2,425,300,000 rubles, or 90.5 per cent; paper manufacturing—from 246,000,000 rubles to 566,000,000 rubles, or 130.1 per cent; the wood-chemical industry—from 105,000,000 rubles to 266,700,000 rubles, or 154.0 per cent.

The rapid growth of the last-named industry is due to the necessity of utilizing the available wood more rationally and completely.

The vast development of the paper industry is made imperative by the growing cultural requirements of the population of the U.S.S.R.

The higher rate of increase in the output of the wood-working industry as compared with that of timber production is due to the necessity of adopting more perfected methods of treating timber and of increasing the supply of high-grade finished products.

Timber Cutting and Wood-Working

The fulfilment of the Second Five-Year Plan is indissolubly bound up with the solution of the problem of properly exploiting the forests of the North and the East. The Urals, the Northern Territory, the Gorky Territory, the Far Eastern Territory, and East and West Siberia assume paramount importance in the cutting and hauling of timber in the period of the Second Five-Year Plan. The proportion of the total output coming from these centres of production is rising from 46.8 per cent in 1932 to 57.1 per cent in 1937, while the percentage of the central regions (Moscow, Western and Central Black Soil Regions and the Middle Volga

Territory, the Ukraine and White Russia) drops to 18.0 per cent in 1937 as against 29.4 per cent in 1932.

The Northern Caucasus, the Azov-Black Sea Territory (2.7-fold increase), the Transcaucasian Republic (2.5-fold increase) and Yakutia (6.7-fold increase) are among the areas which are not very important but which nevertheless show considerable development in the period of the Second Five-Year Plan.

To meet the growing lumber requirements of national economy, the lumber output is being increased from 99,400,000 cu. metres in 1932 to 170,000,000 cu. metres in 1937, *i.e.*, by 71 per cent.

The working up of the raw material by the sawing and woodworking industry will show an increase of 78.1 per cent in 1937 as compared with 1932. The paper industry will double its consumption of lumber during the same period. In 1937 the coal and ore-mining industries will be supplied with 3.5 times as much timber as in 1932. The Plan contemplates a sharp reduction during the Second Five-Year Plan period in the primitive hand sawing of round logs at construction sites and an increase in the quantities of machine-sawn timber supplied to the various construction jobs.

This procedure will effect considerable economies in timber and in transportation facilities, and will result in a relative diminution of timber consumption at construction sites.

The considerable increase in the volume of timber hauled and the changes mapped out in the geographic distribution of the timber industry according to districts are increasing the average haul of timber under the control of the People's Commissariat of Timber from 7.5 km. in 1932 to 10.5 km. in 1937. The proportion of float timber is increasing from 60 per cent of the total timber procured in 1932 to 70 per cent in 1937.

The mechanization of timber production is of tremendous importance in the reorganization of the timber industry. The following data are characteristic of the extent to which the principal timber-procuring processes within the system of the People's Commissariat of Timber will be mechanized in 1937: logging is to be mechanized to the extent of 16.4 per cent; stripping—62.7 per cent; hauling—28.3 per cent, inclusive of rationalized hauling—62.9 per cent. As compared with 1932 the proportion of mechanized stripping is increasing 3-fold, of mechanized hauling—6-fold. The rate of mechanization is still higher in logging, which in 1932 was merely experimental.

It is of importance to note that the mechanization and rationalization of the initial timber transportation under the control of the People's Commissariat of Timber give rise to a 78.7 per cent increase in the quantity of timber transported as compared with 1932, and to a 40 per cent increase in the length of average haul, while the demand for horse-drawn transportation in 1937 will exceed that of 1932 by only 2-3 per cent.

Parallel with the increased mechanization of timber hauling, a considerable growth in the mechanization of timber floating has been projected. The Second Five-Year Plan period provides for the following rates of mechanization in the main processes of floating: the tonnage of the propelled fleet, which on January 1, 1933, totalled 110,000 tons, is increasing to 170,000 tons, *i.e.*, by 54.6 per cent. This growth is parallelled by a considerable growth of the self-propelled fleet under the People's Commissariat of Timber. The mechanization of rafting is scheduled to increase from 20 per cent on January 1, 1933, to 63 per cent by the end of the Second Five-Year Plan period. The mechanization of loading operations is being increased from 25 to 45 per cent, while mechanized unloading is increasing from 40 per cent to 68 per cent. The sum of 87,000,000 rubles is being invested to carry out the specified mechanization while 51,000,000 rubles is the amount fixed for the amelioration of the extensive stretches of forest land newly opened up to exploitation. These investments make it possible to render rivers passable for rafts for an additional length of 30,000 km.

The growth of mechanization and rationalization is intimately connected with the creation of permanent cadres consisting largely of skilled workers.

The capital to be invested within the system of the People's Commissariat of Timber in the exploitation of forests during the period of the Second Five-Year Plan has been set at 950,000,000 rubles. Of this sum, 721,000,000 rubles are intended for industrial equipment, 199,000,000 rubles for floating operations and 30,000,000 rubles for transshipment points.

The following appropriations have been made for various investment purposes: 444,000,000 rubles for the mechanization of timber hauling; 153,500,000 rubles for the mechanization of floating operations; 206,800,000 rubles for housing construction and 145,700,000 rubles for miscellaneous work.

The projected volume of capital investments ensures an in-

crease in mechanized hauling of from 4,200,000 cu. metres in 1932 to 45,600,000 cu. metres in 1937, while the volume of rationalized hauling is rising from 16,000,000 cu. metres in 1932 to 55,700,000 cu. metres in 1937.

The following data show the extent of timber hauling by various types of mechanized transportation in 1937:

	(in million cu. metres)
Narrow-gauge railway	15.2
Tractor railway	9.5
Suspended cableway	2.8
Ice roads, tractor-drawn	2.3
Corduroy roads, motor-driven	15.8
Rationalized ice roads	40.8
Corduroy roads, horse-drawn	14.9

The amount of capital invested in housing construction provides the required housing space to accommodate permanent cadres of workers, who at the end of the Second Five-Year Plan period are bound to play a dominant role in the procurement and floating of timber.

Timber sawing: the specified output of sawn materials for 1937 is 43,000,000 cu. metres as against 24,410,000 cu. metres in 1932—an increase of 76 per cent.

Within the system of the People's Commissariat of Timber the output of saw-mill products will amount to 28,500,000 cu. metres in 1937 as against 15,400,000 cu. metres in 1932—an increase of 85.7 per cent. A 72.8 per cent increase in the output of saw-mill products has been projected under the Second Five-Year Plan for all the principal timber organizations (People's Commissariat of Timber, Timber Department of People's Commissariat of Heavy Industry, All-Union Association of Timber Transportation, Chief Forestry Board and All-Union Council of Timber Co-operative Societies). These organizations are scheduled to increase their output of saw-mill products from 21,560,000 cu. metres in 1932 to 37,250,000 cu. metres in 1937. The output of saw-mill products by the auxiliary enterprises of other People's Commissariats and by enterprises not organized in industrial trusts is projected to be 5,750,000 cu. metres in 1937 as against 2,850,000 cu. metres in 1932, an increase of 102 per cent.

The higher rate at which output of saw-mill products is increasing in the enterprises which do not belong to timber organ-

izations and in the industries which are not consolidated in trusts is due to the fact that these enterprises are not working at capacity at the present time, and that the existing mills are scheduled to be utilized at maximum capacity as far as raw materials may be available.

The transfer of some of the technically equipped saw-mills which lack an adequate source of raw materials to regions where timber may be had in abundance will increase operations at these mills and yield greater quantities of sawn material.

While the total output of saw-mill products is growing from 24,410,000 cu. metres in 1932 to 43,000,000 cu. metres in 1937, *i.e.*, by 18,590,000 cu. metres, the Plan stipulates that about 7,000,000 cu. metres of this total is to be produced by saw-mills whose construction will be commenced in the course of the Second Five-Year Plan period. The remaining increase in output—11,590,000 cu. metres—must be obtained from the mills whose construction was begun in the course of the First Five-Year Plan period, and from the full capacity operation of the existing plants.

The consumption of saw-mill products by construction jobs, by industry and for general purposes is growing rapidly in the course of the Second Five-Year Plan period. Thus the consumption of saw-mill products by construction jobs is increasing from 9,100,000 cu. metres in 1932 to 18,200,000 cu. metres in 1937, *i.e.*, a 100 per cent increase. Industry is augmenting its requirements from 7,500,000 cu. metres in 1932 to 13,350,000 cu. metres in 1937, *i.e.*, by 78 per cent. The rapid rates of development of industries like railroad car building and automobile manufacturing account for the increased industrial consumption of saw-mill products. A total of 2,400,000 cu. metres of saw-mill products will be set aside in 1937 to supply the needs of the general market, as against 730,000 cu. metres set aside for this purpose in 1932—a 3.3-fold increase.

The shifting of the timber industry to the north-eastern regions of the European part of the U.S.S.R., coupled with so important a factor as the exploitation of the forests of Siberia and the Far Eastern Territory, involves a change in the relative importance of the individual regions producing saw-mill products. Thus the proportionate output of the Northern Territory is rising from 16.0 per cent in 1932 to 17.8 per cent in 1937, while that of the Urals is increasing from 6.2 per cent to 7.7 per cent. Consider-

ably greater is the change in the proportion of output delivered by the forest regions of the Asiatic part of the U.S.S.R. Whereas in 1932, the proportionate output of these regions (West and East Siberia, Yakutia and Far Eastern Territory) constituted 10.5 per cent, in 1937 it will rise to 16 per cent.

Timber sawing is improving considerably in the Northern Caucasus and in the Transcaucasian Republic. In the last year of the Second Five-Year Plan period the output of saw-mill products in these regions will increase approximately 3.5 times as compared with 1932. This is due to the necessity of opening for exploitation considerable areas of hardwood trees and of other valuable kinds of wood, in order to increase Soviet exports and to be better able to cope with the sharply rising requirements of the individual branches of national economy for these kinds of timber.

Timber sawing on the Lower Volga occupies a special position. The 151.2 per cent increase in the output of saw-mill products scheduled for this district depends to a considerable extent upon the increasing operations at the present saw-mills. Only 40 per cent of the planned growth in the output of saw-mill products on the Lower Volga is to be obtained by building new mills. Moreover, the final decision on the erection of these mills can only be made after the solution of the Volga-Kama problem and the problem of passing the rafts down the Volga River in which the construction of locks and hydro-electric stations must be taken into consideration.

In order to increase the output of processed material and finished products for various branches of industry and building organizations, the program provides that the saw-mills to be constructed in the course of the Second Five-Year Plan period shall in the main take the form of combined enterprises equipped with shops for the further processing of the lumber produced.

On the other hand, in order to supply the separate timber procurement stations as far as possible with an adequate number of saw-mills, and in order to locate the latter in the immediate vicinity of sources of raw material, the Plan further provides for the construction of temporary saw-mills of a light type, and of mobile sawing frames.

For the plywood industry the program specifies the construction of 12 mills having 36 units with a total capacity of 400,000 cu. metres of plywood (exclusive of the Murom and Leska Mills

now nearing completion). Of these 12 mills, 6 are scheduled to commence operations in the course of the Second Five-Year Plan period and to yield up to 140,000 cu. metres of plywood in 1937. The total output of plywood is to increase from 423,000 cu. metres in 1932 to 735,000 cu. metres in 1937, *i.e.*, by 74 per cent.

Wood working: bearing in mind the scarcity of packing material in the country, the Plan provides for an output of 2,080,000 cu. metres of packing boxes in 1937 as against 879,000 cu. metres in 1932 (an increase of 137 per cent), and 1,049,000 cu. metres of sawn and radial staves as against 223,000 cu. metres, or a 4.7-fold increase.

The development of the furniture industry is to be achieved by improving operations in the existing furniture factories, and by building new factories to manufacture parts and sections of furniture as well as plants for assembly. It is intended to build such factories in Chelyabinsk, the Donetz Basin, the Far Eastern Territory, Tashkent and elsewhere.

It is projected to raise the value of the furniture output manufactured under the control of the People's Commissariat of Timber to 250,000,000 rubles in 1937 as against 73,900,000 rubles in 1932 (in 1926-27 prices). The furniture produced by the timber cooperative organizations will represent a value of 248,000,000 rubles in 1937 as against 109,500,000 rubles in 1932 (in 1932 prices).

During the period of the Second Five-Year Plan, 1,140,000,000 rubles are being invested in the wood-working industry of the People's Commissariat of Timber.

Forestry: the Plan provides for an extensive study of forestry, of forestation and large-scale rationalization of forestry during the Second Five-Year Plan period.

Following are the lines pursued by the People's Commissariat of Timber in its study of forests during the period of the Second Five-Year Plan, for which 67,200,000 rubles have been appropriated.

Years	Forest regulation	Aerial photography	Registration	Drawing up of exploitation program
	(in million hectares)			
1933	4.5	19.7	21.0	0.6
1937	8.6	26.0	26.9	4.7
Total for the five years	40.0	128.2	161.8	19.0

By the end of the Second Five-Year Plan period the forest resources under the People's Commissariat of Timber must be thoroughly surveyed. A detailed inventory of forest lands covering an area of 40,000,000 ha. must be taken at factory construction sites.

The reforestation program specifies that 18,800 ha. be afforested in 1933 and 35,200 ha. in 1937. The total area to be afforested in the course of the five years is set down as 141,500 ha., which will involve the expenditure of 20,900,000 rubles.

The total amount of capital to be expended for forestry purposes is fixed at 109,000,000 rubles.

The measures introduced in the Volga, Dnieper and Don River Basins for flood protection are of vital importance in the development of the forests. Afforestation must be developed along the banks of these rivers. It is intended to afforest 167,300 ha. in 1937 as against 42,700 ha. in 1933. In the course of the entire second quinquennial period a territory comprising 476,100 ha. will be afforested within the confines of the U.S.S.R.

Wood-Chemical Industry

Following are the chief tasks to be accomplished by the wood-chemical industry during the period of the Second Five-Year Plan:

1. To develop the rosin and turpentine industry at an accelerated rate by utilizing timber waste—pine tree stumps and other types of rosin-bearing substances;

2. To develop the output of acetic acid, of methanol and acetone by wood-chemical methods, chiefly by utilizing waste gases obtained from charcoal production in the metallurgical industry and from gas generators using wood fuel;

3. To master the technique of new production processes—hydrolyzation and the manufacture of plastics from wood pulp.

In view of the tremendous importance of wood chemistry for the rational utilization of timber waste, the Five-Year Plan provides that the wood-chemical output of the People's Commissariat of Timber be increased in value from 59,500,000 rubles to 162,700,000 rubles, *i.e.*, by 173.4 per cent.

The output of turpentine must grow from 36,300 tons in 1932 to 67,000 tons in 1937, *i.e.*, by 84.6 per cent.

The production of acetic acid is increasing from 2,700 tons in 1932 to 12,300 tons in 1937.

The sum of 214,000,000 rubles has been appropriated for the purpose of capital investment in wood chemistry during the Second Five-Year Plan period.

Paper Industry

The Second Five-Year Plan provides for an increase in paper production of from 471,200 tons to 1,000,000 tons, *i.e.*, 112.2 per cent. This includes the output within the system of the People's Commissariat of Timber, which is increasing from 437,400 tons to 950,000 tons. The output of millboard and fibre must grow from 42,500 tons to 125,000 tons, or 194.1 per cent. This includes the output within the system of the People's Commissariat of Timber which is increasing from 36,700 tons to 107,000 tons. The output of high quality paper produced by the enterprises under the control of the People's Commissariat of Timber is to rise from 277,200 tons to 585,000 tons, or 111 per cent.

It was not until 1933 that the Soviet machinery industry proceeded to master the technique of manufacturing the various complicated types of equipment used by the paper industry.

Now heavy industry is confronted with the task of adapting the existing machinery plants to the manufacture of paper-making machinery and of increasing the supply of such machinery by building a powerful new plant with a yearly output of from 10 to 15 paper-manufacturing machines. This will make it possible to realize the outlined program for paper manufacturing by the use of Soviet machines. After the reconstruction and intensification of the steam and power supply of the existing paper mills, they will yield at least 650,000 tons of paper out of the total of 1,000,000 tons stipulated in the Plan for the year 1937, while the remaining 350,000 tons will have to come from mills to be newly erected.

Important changes are taking place in the period of the Second Five-Year Plan in the geographic distribution of the paper industry. There is a general shift eastward and toward the national republics; the plants are being brought nearer to the sources of raw materials. New paper mills are being erected in the Sverdlovsk Region, the Karelian Republic, the Gorky Territory, in East Siberia, Central Asia and in the Transcaucasian Republic, while the present mills are located chiefly in the western regions of the Union.

The following are the basic factors which determine the trend of construction in the paper industry:

1. Complete elimination of the scarcity of semi-finished products such as cellulose and wood pulp, the lack of which restricted the output of paper under the First Five-Year Plan;

2. Concentration of the paper industry, and completion of the whole production cycle in one enterprise—a combination, from the working up of the primary raw material to the output of finished products.

The Volga Combination (Balakhna) with an output of 115,000 tons of newsprint per annum, and the Kama Combination with an output of 92,000 tons of printing paper are the largest paper mills in Europe and rank with the largest in the world. In the period of the Second Five-Year Plan construction will start on a number of new paper mills. The largest of these will be the Krassnoyarsk Mill (64,500 tons capacity), the Chulym Mill (55,000 tons), the Ufa Mill (63,000 tons), the Ust-Vetluga Mill in the Mari Autonomous Region (60,000 tons), and several minor mills. Every-one of these plants is a combination designed for a complete cycle of production operations.

The program of new constructions in the paper industry contemplates the erection of a sulphate and cellulose mill and of a factory to manufacture Kraft paper. The latter is used for packing cement and mineral fertilizers; also for cable insulation, etc. The Plan further provides for the construction of a fibre combination which will supply fibre to the automobile and other industries. It specifies the production of cellulose by the chlorination process, the construction of a plan for the production of cellulose by Professor Zherebov's continuous boiling method, the construction of a plant or a department for the production of linseed flax composition material made of linseed flax straw, which can serve as an excellent substitute for the deficient supply of rags required in the manufacture of certain special grades of paper.

Under the Second Five-Year Plan, 870,000,000 rubles will be invested in the paper industry.

* * *

The development of mechanization and rationalization in the timber industry, parallel with the systematic organization of labour and the improved material and cultural services enjoyed by the workers in the timber industry, is resulting in a 34 per cent

increase in general labour productivity. This general percentage, however, fails to reflect the actual increase in the productivity of labour due to the structural changes which are taking place in the timber industry (the increased proportion of floating, the lengthening of the timber haul, etc.). If all these structural changes are taken into consideration, it will be found that in the Second Five-Year Plan period the productivity of labour is increasing as follows: in logging—48 per cent, in timber stripping—57 per cent, in floating—60 per cent, in hauling—70 per cent (in cubic metres). Labour productivity in the mills as a whole under the People's Commissariat of Timber will be increased 60 per cent in 1937, the increase being 57 per cent in the wood-working industry.

The increased productivity of labour in the mills under the People's Commissariat of Timber is to be achieved by the application of the following measures:

1. Better operation of the machines and units and the introduction of new equipment, so that the efficiency of the saw-mill equipment will be increased 21.5 per cent (from 22.4 cu. metres per frame shift in 1932 to 29.9 cu. metres in 1937); in the manufacture of plywood—by 8.5 per cent (from 9.33 cu. metres to 11.1 cu. metres); in the production of sulphite cellulose—by 16 per cent;

2. Intensified mechanization of a number of laborious processes in the mills (feeding, hauling and stacking of raw materials and finished products);

3. Improvement in the organization of production, and in the qualifications of the workers, proper distribution of labour power and improvement in the material welfare of the toilers.

The timber industry plays an exceptional part in the fulfilment of the vast construction program mapped out for the Second Five-Year Plan period, and in the satisfaction of the paper requirements of the developing cultural revolution. These facts impose upon the timber industry the paramount task of mastering its newly installed modern machinery which is radically changing the technical level of this industry.

LIGHT INDUSTRY

THE fulfilment of the tasks of the Second Five-Year Plan period—the period of radical improvement in the living conditions of the masses of workers and peasants—requires that during this period light industry increase its output 2.5-fold.

The value of the output of this industry is increasing from 7,800,000,000 rubles in 1932 to 19,500,000,000 rubles in 1937.

The average annual rate of increase in the output of light industry is 20 per cent.

The output of light industry under the People's Commissariat of Light Industry is set at 4,900,000,000 metres of cotton fabrics (an increase of 2,304,000,000 metres as against 1932), 220,000,000 metres of woollen fabrics (a 2.4-fold increase as against 1932), 600,000,000 sq. metres of linen fabrics (4.6 times the output of 1932), 2,300,000,000 rubles' worth of knit goods (4.6 times the output of 1932), and 180,000,000 pairs of boots and shoes (2.3 times the output of 1932). The output of matches must increase from 5,600,000 cases to 12,000,000 cases and the output of goods for cultural purposes must multiply 2.8 times.

The substantial increase in the volume of output must be accompanied by a considerable improvement in the assortment of the goods produced by light industry. Thus, in the textile industry the production of overcoatings is increasing from 100,000,000 to 346,000,000 sq. metres; of suitings—from 280,000,000 to 554,000,000 sq. metres; of dress goods—from 395,000,000 to 921,000,000 sq. metres; and of white goods—from 300,000,000 to 930,000,000 sq. metres. The proportion of white goods in the total output of textiles is increasing from 15.5 per cent to 23 per cent.

The Second Five-Year Plan period is characterized not only by progress along these lines but also by an advance with regard to textile fibres which show a tendency to improve the quality of output by increasing the proportion of the more valuable fibre.

The proportion of linens and woollens, particularly of knit goods, in the total output is growing considerably. The structural

changes planned in the production of textile goods can be seen from the following table:

Fabrics	Percentage of total output (conventional m^2)	
	1932	1937
Cotton fabrics	80.1	67.0
Linen fabrics	5.4	10.9
Woollen fabrics	5.2	5.6
Silk fabrics	1.0	1.1
Total woven goods	91.7	84.6
Total knit goods	8.3	15.4
of which:		
From woollen yarn	0.4	2.4
From silk yarn	0.4	1.5
Total textile goods	100.0	100.0

The quality of cotton dress goods is showing a marked improvement in consequence of the production of materials of the marquisette and voile type due to the increasing supply of Soviet-grown Egyptian cotton. The quality of white goods is also improving greatly.

With the opening of the Barnaul Textile Combination and the reconstruction of a number of clothing-material factories, the production of melange clothing materials—the highest grade product of its kind—can be considerably increased.

There is also a considerable rise in the output of pile fabrics which can partly replace woollen materials. This applies particularly to fustian fabrics like corduroy and velveteen. The proportion of the coloured fabrics is also growing.

While the woollen industry as a whole is increasing its production 2.4-fold, the output of worsteds is rising sharply from 13,600,000 metres to 75,000,000 metres, and of overcoatings—from 33,000,000 to 82,000,000 metres, inclusive of 18,000,000 metres of heavy cloth made of wool and fine rags.

At the same time a considerable improvement in quality is planned for all groups of the woollen industry to result from the refining of the raw material mixture. In the woollen industry the proportion of vegetable admixtures (fibres) is being reduced and the composition of the wool improved.

The proportion of fine wool is increasing in the worsted industry from 6.4 per cent to 33 per cent, in the fine cloth industry—from 4 per cent to 8.5 per cent, with a corresponding reduction in the percentage of coarse wool. The quality of wool shoddy is

improving considerably. At the same time the extensive differentiation of mixtures which it is planned to introduce make possible an increase in the output of all-wool fabrics from 9,000,000 to 40,000,000 metres.

In the linen industry, the output of fabrics for general consumption is increasing to 320,000,000 sq. metres. This in the main will provide table and bed linen and materials for summer wear.

In the knit-goods industry, the manufacture of outer-wear is increasing from 6,000,000 to 30,000,000 pieces. The percentage of cotton yarn in these manufactures is being reduced while there is a considerable increase in the percentage of wool and artificial fibres. The output of hosiery is increasing from 154,000,000 to 725,000,000 pairs, with a considerable improvement in quality.

Substantial changes are taking place in the very texture of the cloth. An improvement in the quality of yarn and a more economical utilization of raw materials is planned by raising the average number of yarns manufactured from 24.6 to 25.5 in the cotton industry, from 20 to 36 in the worsted-goods industry and from 5.5 to 7 in the fine-cloth industry, while simultaneously increasing the closeness of the weave.

This improvement in the quality of yarn, while improving the quality of finished goods, will at the same time effect an economy of up to 5 per cent in raw materials. The revision of standards in the linen-goods industry also effects an economy in raw materials, while simultaneously improving the quality of the weave.

The woollen-goods industry must master the so-called English method of manufacturing woven cloth by closely weaving a wool of single-type shoddy on a cotton warp. This will considerably improve the quality of the woollen textures produced and will produce greater variety.

In the textile industry greater importance will be acquired by textures woven from twisted yarn, which increases the endurance of the texture and improves its appearance.

More attention to the finishing processes, better dyeing, an increase in the output of coloured fabrics in the cotton and woollen industries and the introduction of printed patterns in the woollen and linen industries will also considerably raise the quality of output.

In the manufacture of footwear, the improvement in the method of sewing and particularly the use of chemical processes to strengthen the soles will greatly raise the quality of output.

The quality of semi-finished goods, both rubber pads and natural leather, is greatly improving. The caoutchouc content of rubber soles will increase to at least 25 per cent, as against 10-12 per cent in 1933, while the percentage of other constituents improving the quality of substitutes will also rise.

The quality of the output of the match industry must show improvement, as this industry is beginning to use high-grade chemicals.

The Second Five-Year Plan also provides for a considerable development of those branches of light industry which serve the cultural needs of the toilers.

The enforcement of universal polytechnic education for adolescents up to the age of 17, the extensive development of preschool education, the further development of the network of mass political and cultural educational institutions (clubs, libraries, Houses of Culture, village reading rooms, etc.) coupled with an increase in their activity, require the rapid development of those branches of light industry on which the satisfaction of the ever-growing cultural needs of the toilers depends.

The output of these branches of industry under the People's Commissariat of Light Industry is multiplying 2.8 times. The greatest development is taking place in the industries producing scientific school supplies, which by the end of the Second Five-Year Plan period will rise in value from 26,500,000 rubles in 1932 to 125,000,000 rubles in 1937 (in 1926-27 prices) or to 472 per cent of the former figure.

Large combinations to manufacture scientific school supplies are being built in Vyatka (the output of this combination alone will be valued at 29,000,000 rubles per year), in Zlatoust and in the Far East to ensure the required increase. Furthermore, it is planned to reconstruct or enlarge the existing enterprises manufacturing such supplies and equipment. The Leningrad Mechano Plant and the Pioneer Plant in the Ukraine which produce mechanical toys are also being enlarged.

The output of general office and school supplies (pencils, colours, pens, copy-books, etc.) is increasing from a value of 67,000,000 rubles in 1932 to 200,000,000 rubles in 1937, or 3-fold. The Plan includes the construction of a large pencil factory in Krassnoyarsk and an office-supply combination in Central Asia.

The Second Five-Year Plan contemplates an expansion of mass amateur art activities, which necessitates an increase in the pro-

duction of musical instruments. It is therefore provided that the output of musical instruments by factories under the control of the People's Commissariat of Light Industry increase 4.4 times. The manufacture of pianos is increasing from 3,800 in 1932 to 28,000 in 1937. This will make it possible to fully satisfy the requirements of clubs and more widely introduce pianos among families of toilers. The output of phonographs is growing from 57,800 in 1932 to 1,500,000 in 1937.

A great deal of attention is being devoted to the production of musical instruments (plucked instruments, wind instruments and accordions). The output of plucked instruments (guitars, balalaikas and mandolins) by enterprises under the People's Commissariat of Light Industry will increase to 1,320,000 in 1937 while that of accordions will rise to 100,000 as compared with 14,700 in 1932.

The handicraft co-operative organizations are also considerably increasing their output of manufactured articles of general consumption. Thus, the making of garments to order and shoe and clothing repairs will in the main be the work of handicraft co-operative organizations. The Plan provides that in 1937, 1,280,000,000 rubles' worth of needle-trades goods and 1,170,000,000 rubles' worth of leather, shoe and fur goods be produced by handicraft co-operative organizations. These organizations will supplement the knit-goods output of the State industry by producing about 21,000 tons of knit goods, inclusive of 190,000,000 pairs of hosiery. The handicraft co-operative organizations will put out 35,000 tons of rope as part of their twisted goods production. The 10,000,000 pairs of felt boots to be produced by the State industry will be supplemented by the 6,000,000 pairs to be produced by the handicraft co-operative organizations. The handicraft co-operatives will develop the production of cultural supplies raising the value of the output of this group to 500,000,000 rubles (exclusive of phonographs).

Light industry will be able to achieve this rapid tempo of development only by completing the reconstruction of its technical base, by extensively mobilizing and rationally utilizing the domestic raw material resources and by energetically developing the production and utilization of substitutes.

The considerable growth of light industry's agricultural raw material base may be seen from the following:

Kinds of Products	State Procurements 1932	1936-37
	(in thousand tons)	
Cotton fibre	382.0	612.0
Flax fibre	287.0	520.0
Hemp fibre	40.0	200.0

The developing production of new kinds of raw materials and substitutes is becoming a very substantial supplementary source of raw materials. The output of leather substitutes is increasing from 30,400 tons to 125,000 tons, and that of cottonine—from 14,000 tons to 65,000 tons. During the Second Five-Year Plan period the cotton-manufacturing industry must master the technique of utilizing cottonine on a large scale using 40,000 tons, or 7 per cent of the quantity of raw materials consumed.

A considerable improvement is also planned in the utilization of raw materials. In the cotton industry, the amount of yarn obtained from raw cotton must be increased from 89 per cent to 94 per cent. The coefficient of utilization of primary raw materials is also increasing in the woollen industry: in the coarse-cloth industry—from 66 per cent to 75.5 per cent, in the fine-cloth industry—from 81 per cent to 84 per cent. The consumption of raw flax per ton of yarn is to be reduced from 1.52 tons to 1.39 tons, the consumption of raw materials in the cordage and twine line is being reduced from 1.5 to 1.29 per unit of finished goods, and for cable production—from 1.6 to 1.15. The consumption of hard semi-finished products (soles, inner soles, heels) per pair of shoes or boots is being reduced from 742 grams to 700 grams and that of soft uppers—from 51.5 sq. decimetres to 47 sq. decimetres.

Improved utilization of raw materials and rational application of substitutes in a number of industries will go far to secure increased production during the Second Five-Year Plan period.

The development of light industry under the Second Five-Year Plan is also secured by projecting an increase in production capacities accompanied by a considerable increase in the utilization of the equipment already existing.

For the principal branches of light industry it is planned to adopt the 3-shift system. (See table on p. 252.)

The Second Five-Year Plan also envisages an increase in the present capacities by achieving higher rates of equipment utilization. Thus, the cotton industry is increasing the output per 1000 spindles from 289 kilo-numbers to 330 kilo-numbers per hour; the linen industry—from 688 kilo-numbers to 1,020 kilo-numbers

COEFFICIENTS INDICATING NUMBER OF SHIFTS

Years	Cotton	Linen		Worsted		Cloth		Hemp	Shoes
		Spinning	Weaving	Spinning	Weaving	Spinning	Weaving		
1932 . . .	2.0	1.4	1.1	0.7	2.1	2.5	2.9	1.7	2.0
1937	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.3

(48 per cent); the worsted industry—from 359 to 520 kilo-numbers (45 per cent); the fine-cloth industry—from 208 to 305 kilo-numbers (46 per cent); the coarse-cloth industry—from 202 to 312 kilo-numbers (54.5 per cent).

In addition to the more effective utilization of the existing equipment and higher productivity of labour, the Plan provides for the extensive development of new construction in light industry.

A new base for the textile industry is being created in the Eastern districts—West Siberia and Central Asia. Of the total of 9,200,000,000 rubles to be invested in construction 5,400,000,000 rubles have been appropriated for new construction.

Fifteen big cotton combinations are being constructed, 5 of which comprise 200,000 spindles each. The capacity of the enterprises to be constructed in new districts will constitute about 20 per cent of the total capacity of the cotton industry, whereas at present these districts possess only 150,000 spindles. The cost of this construction will total 1,755,000,000 rubles.

Twelve big woollen mills are being constructed representing a total capacity of 357,000 spindles—2 in the Ukraine, 2 in the Azov-Black Sea Territory, 2 in Central Asia, 3 in Siberia and 1 in the Chelyabinsk Region. When these mills begin operations they will produce 44 per cent of the total output of the woollen industry.

Twelve linen goods combinations are being built, possessing a total capacity of 279,000 spindles—3 in the Western Region, 3 in the Gorky Territory and 1 each in the Ivanovo, Moscow and Leningrad Regions, West Siberia, the Ob-Irtysh Region and the White Russian Socialist Soviet Republic. In the Northern Territory a yarn spinning mill with a capacity of 16,000 spindles is being erected. In these new districts a capacity is being created equal to that of the Ivanovo Region, in which almost the whole linen-goods industry is at present concentrated. This construction will cost a total of 525,800,000 rubles.

Nine hemp enterprises are under construction. They represent

a total capacity of 100,500 tons of twisted goods and 1,000,000 nets—2 enterprises each in the Middle Volga Region, West Siberia and the Central Black Soil Region, and 1 each in the Ukraine, Kirghizia and the Northern Caucasus. This construction will cost a total of 146,000,000 rubles.

Eighteen knitting combinations and independent mills are being built. A powerful spinning base for the knitting industry is being created by the construction of specialized spinning mills attached to the several combinations which are to serve the knitting industry exclusively. The total capacity of the knitting mills is scheduled to be 508,000,000 pairs of hosiery, 105,600,000 pieces of underwear, 28,000,000 pieces of knit goods for outer-wear and 87,000,000 pairs of gloves. The total capacity of the spinning mills has been set at 86,100 tons. New knitting mills are being built in West Siberia, in the Volga Region, in Central Asia, in the Azov-Black Sea Territory and in the Central Black Soil Region. The knit-goods base in Transcaucasia is greatly developing. Simultaneously with the reconstruction of the existing relatively small knitting mills, the following mills are being built in the Ukraine: one large knitting combinaton, 2 hosiery mills, 1 glove factory and one mill manufacturing knit goods for outer-wear. The total value of this construction will amount to 866,100,000 rubles.

Twenty-one shoe factories are under construction, representing a total capacity of 100,000,000 pairs. Seven of these factories, with a capacity of 29,000,000 pairs, will be located in the Eastern districts where they will be distributed as follows: 4 factories with a total capacity of 13,000,000 pairs in Central Asia and 3 factories with a total capacity of 16,000,000 pairs in Siberia. Two factories with a total capacity of 12,000,000 pairs are scheduled for the Volga districts. The total value of this construction will amount to 306,900,000 rubles.

The needle-trades industry is being established for the first time in a number of industrial towns.

Two match factories are under construction—one in Perm and the other in West Siberia. They will represent a capacity of 1,800,000 cases a year while the total capital investment in this branch of industry will be 60,000,000 rubles.

The great increase in the manufacture of musical instruments contemplated by the Plan necessitates the construction of piano factories in Leningrad, Novosibirsk, the Ukraine, Trans-

caucasia, White Russia and the Azov-Black Sea Territory; factories for plucked instruments in the Chuvash Republic, for accordions in Vyatka and elsewhere. Besides, it is intended to enlarge the existing factories in Leningrad, Moscow and the Ukraine.

A number of products, principally substitutes for light industry (*e.g.*, cottonine and leather substitutes) and tanning extracts, will be produced almost entirely by new enterprises. From 60 to 70 per cent of all articles for cultural purposes will also be produced by new enterprises. The output of the new enterprises in the knit-goods, leather and shoe industries will constitute approximately 55 per cent of the total. New enterprises in the linen-goods and hemp industry will produce from 40 to 55 per cent of the total output. In the woollen industry about one-fourth of the total output will be accounted for by new enterprises.

Inasmuch as the new enterprises are to contribute a considerable share of the output planned for the Second Five-Year Plan period, the task of mastering the new technique, of mastering the production of new manufactures of light industry, is highly important.

The new construction planned for light industry is causing decided alterations in the geographic distribution of this industry, is setting up new centres of light industry in the Eastern districts (Siberia, Central Asia and Transcaucasia) and is changing the face of light industry in the Ukraine by establishing there powerful plants equipped with advanced technique alongside of the existing small and medium enterprises. Light industry is undergoing considerable development in the Azov-Black Sea Territory and in the Northern Caucasus. A linen-manufacturing centre is being established in the Western Region and in the Gorky Territory, a hemp and knit-goods manufacturing centre in the Middle Volga Territory.

Thus the problem of a more even distribution of textile industry, of bringing it closer to the main regions supplying the raw materials and consuming the finished product, is finding its solution. Most of the new construction is rising in Central Asia.

The Uzbek Socialist Soviet Republic is intensively developing the cotton goods industry (*e.g.*, building the Tashkent Combination with a capacity of 200,000 spindles) as well as the knit-goods and silk industries. Capital investments in the Uzbek Republic represent a total of 298,100,000 rubles which provide for the construction of 14 enterprises.

The Tajik Socialist Soviet Republic is likewise becoming a big cotton-manufacturing centre through the construction of the Stalinabad Combination of 100,000 spindles and the Khojent Combination of 200,000 spindles. The same may be said of the Turkoman Socialist Soviet Republic where an aggregate of 200,000 spindles is being installed.

The Plan maps out the construction in Tajikistan of 7 enterprises of light industry representing a total value of 310,600,000 rubles, and 7 enterprises in Turkmenia representing a total value of 270,000,000 rubles.

In Kazakstan there are being constructed: 1 cotton combination, 1 woollen combination, 4 leather and shoe factories, etc.—altogether 10 enterprises representing a total value of 227,000,000 rubles.

West Siberia is second in the order of total capital investments. There it is planned to build 24 enterprises involving a total expenditure of 718,000,000 rubles. The Plan contemplates the construction of 4 big cotton combinations at a cost of 355,500,000 rubles, 2 woollen combinations at a cost of 79,000,000 rubles, 1 knit-goods combination (comprising a cotton-spinning mill, a woollen-spinning mill, a hosiery mill and factories for the manufacture of gloves, white goods and knit goods for outer-wear) to cost 143,000,000 rubles and 1 hemp combination having a capacity of 15,000 tons of manufactured goods and involving an expenditure of 13,000,000 rubles. In addition to this vast construction for the textile industry, it is contemplated to build 2 shoe factories, 1 factory of semi-finished leather goods and 1 factory for the silicate industry.

By the end of the five-year period the Ukrainian Socialist Soviet Republic will be transformed into a large textile-manufacturing district. The plan specifies the following construction for this republic: 2 cotton mills with a total capacity of 200,000 spindles and representing a cost of 170,000,000 rubles, 1 knit-goods combination, 2 hosiery mills, 1 factory manufacturing knit goods for outer-wear and 1 factory manufacturing gloves, representing a total cost of 177,400,000 rubles; furthermore, 2 woollen combinations having a capacity of 94,000 spindles and representing a total cost of 95,000,000 rubles; a big hemp combination manufacturing twisted goods with a capacity of 15,000 tons and representing a cost of 17,000,000 rubles. Much building is also going on in the leather and shoe industry, which is adding 2 shoe factories, 1 factory

manufacturing soft semi-finished uppers and 2 factories manufacturing substitutes. The total construction program mapped out for the Ukraine comprises 30 enterprises representing an aggregate value of 758,800,000 rubles.

In the Transcaucasian Socialist Federated Soviet Republic there are being constructed: 3 cotton combinations having a capacity of 277,000 spindles and 2 knit-goods combinations (comprising 2 cotton-spinning mills, 2 hosiery mills, 2 factories manufacturing white goods and 1 factory manufacturing gloves). The sum of 265,000,000 rubles is being invested in these 5 construction jobs. Altogether, 346,000,000 rubles are to be expended to build 18 enterprises for the light industry of the Transcaucasian Republic.

The following construction is projected for the Azov-Black Sea Territory: 2 woollen combinations, 1 knit-goods combination (comprising one cotton-spinning mill, 1 underwear factory and 1 hosiery factory). A cotton combination is scheduled to be built in the Northern Caucasus, where likewise a large net-making mill having a capacity of 1,000,000 nets, a glass works and leather and shoe factories are under construction. Altogether the Plan for the Azov-Black Sea Territory maps out the construction of 11 enterprises, involving the expenditure of 184,000,000 rubles, and in the Northern Caucasus—the construction of 9 enterprises at a cost of 152,500,000 rubles.

In the Gorky Territory, 3 linen combinations, polytechnic school-equipment plants (in Vyatka) and a number of leather and shoe factories are under construction. Altogether 245,400,000 rubles are to be invested in 19 enterprises in this territory.

The Western Region has under construction: 3 linen-goods combinations, 2 of which are to manufacture linen fabrics for general consumption; also 2 leather and shoe factories representing a total cost of 23,000,000 rubles. It is proposed to invest 162,000,000 rubles in the Western Region to build a total of 8 enterprises.

Light industry in the Middle Volga Territory has under construction a large knit-goods combination (comprising a cotton-spinning mill, a wool-spinning mill, a hosiery mill and factories manufacturing white goods, gloves and knit goods for outerwear); furthermore 2 hemp combinations and 3 shoe factories. The total cost of building the 12 new enterprises has been set at 273,000,000 rubles.

The immense tasks which have been assigned to light industry necessitate its thorough technical reconstruction.

Technical re-equipment in light industry is finding application in the first place in the substitution of more efficient high-speed automatic equipment for the old slow types of machines consuming excessive labour.

In the cotton industries the ring spindle spinning frame is forcing out the spinning mule which will continue to be used for waste spinning, for the manufacture of specially high yarn numbers and partly for the manufacture of knit goods. Mule equipment which in 1932 constituted about 25 per cent of all spindles is being reduced by half, while the total number of spindles is increasing 40 per cent. By the end of the Second Five-Year Plan period mule spindles will represent not more than 9 per cent of the total equipment.

In cloth spinning, the highly efficient Krushchov ring spindle spinning frame, an ingenious Soviet invention, is being introduced. A thousand spindles of this machine turn out 450 to 500 kilo-numbers per hour as against 220-240 kilo-numbers turned out by present self-actor machines. These new ring spindle spinnning frames are to constitute more than 30 per cent of the entire equipment by the end of the Second Five-Year Plan period.

The Zvorykin water spinning frame, also a Soviet invention, is bound to effect a complete revolution in flax spinning. While the spindles of the cotton ring spindle spinning frame make 10,000 r.p.m., the flax water spinning frames are unable to attain more than 4,000 to 5,000 r.p.m. The Zvorykin water spinning frame raises the number of revolutions to 7,000 a minute. All new combines will be equipped with these high-speed Zvorykin water spinning frames which will constitute 59 per cent of all spinning equipment.

In the manufacture of twine and cordage, electric spindles with automatic stops and automatic removers are being introduced on a large scale, their number increasing 7-fold by the end of the five years.

The use of automatic machinery is spreading rapidly throughout the textile industry, particularly in weaving. New plants are being equipped with automatic machinery, while the reconstructed plants are being supplied with automatic appliances. The introduction of automatic machinery in weaving must be particularly effective because this department absorbs 60 per cent of the pay roll. By the end of the Second Five-Year Plan period not less than 40 per cent of all weaving equipment is to be automatic.

Automatic machines are being introduced for the first time in the woollen industry while high-speed machinery is being applied to an increasing extent in the manufacture of worsted goods (the percentage rising from 2.8 in 1932 to 52 in 1937). Automatic machinery will represent 42.5 per cent of the total in 1937.

The use of automatic machinery will be particularly extensive in the bast-fibre industry. The application of coilers, presses, automatic removers, mechanical and electrical stops and signals which eliminate and prevent irregularities in the functioning of the machine make it possible to bring this branch of the industry nearer to the level of the cotton industry, technically the most advanced branch in the processing of fibre.

On the basis of the technical reconstruction of the bast-fibre industry, primarily the hemp industry, the latter will during the course of the Second Five-Year Plan period completely discard the use of hand-operated and semi-automatic equipment which at the present time constitutes about 30 per cent of the total.

The solution of the problem of mechanizing the shoe and leather and the needle-trades industries is highly important. The crux in the technical reconstruction of leather manufacturing consists in the extensive use of chemicals accompanied by the further mechanization of such laborious processes as the filling and emptying of vats, by the complete mechanization of cutting semi-finished uppers and by starting the use of ready-made parts (particularly pressed one-piece soles) in the manufacture of footwear.

The Soviet needle-trades industry which developed large-scale production under the First Five-Year Plan now occupies first place in the world in degree of concentration, but has not yet attained the standard of mechanization prevalent in the advanced capitalist countries. In 1932 only about 50 per cent of cutting and sewing was mechanized in the needle trades. High-speed universal machines are not in sufficient use, while special machines and attachments (button-hole and button machines, etc.) are poorly utilized. In the needle-trades industry during the Second Five-Year Plan period it is planned to mechanize the sorting and selection of fabrics, to introduce apparatus for examining and rejecting fabrics, to make the equipment for the various sewing processes automatic and to introduce mechanical pressing. These changes will signify the shift to a system of machinery in all the main processes of the needle-trades industry.

Maximum simplification of the technological process itself by eliminating superfluous operations, which under the old process of textile manufacturing increased only the mechanical action on the fibre, represents one of the principal features of the reconstruction program as it affects the textile industry. The new plans for spinning represent the most striking example of the application of this principle. In the cotton industry these new plans for spinning make it possible to completely eliminate all preliminary operations of spinning (speed-frame shop under the extra-stretch system) or to reduce it to a considerable extent (high-stretch system).

An essential feature of the reconstruction carried out under the Second Five-Year Plan is the principle of combining in one unit machines which hitherto worked separately, either performing the same function repeatedly, or performing different functions closely related in the course of the technological process. These reconstruction measures must first be applied in the preparatory and finishing shops of the textile industry.

A whole loosening and swingling department with 4 and even more machines (dependent upon the fibre) will now be combined in a single machine unit, the various sections of which are interconnected by pneumatic or other feed. This machine unit is to work automatically throughout and to be equipped with electric controls which regulate the prompt stopping of electric motors and the system as a whole as well as the steady rate of flow from the feeders.

In the hemp industry the application of the newly constructed tar apparatus and the replacement of the rope walks by stationary vertical and horizontal machines will make it possible to institute the continuous operation of the whole technological process of rope manufacturing and the combination of this machinery into complex units.

Electrification is one of the most far-reaching technical features in the reconstruction of light industry during the years of the Second Five-Year Plan. The electric carding machine already designed, invented by the Soviet engineer Friedkin, will be the greatest factor in the electrification of light industry.

So far the electric-carding machine is the only instance where the principle of designing complete machine units, which combine technological and electromotive functions, has been technically applied. However, this principle can be extended even in the very near future to a number of other textile machines, one of the

organs of which consists of an electricity-conducting cylinder, particularly a metallic cylinder.

The adoption of chemical methods in certain processes of light industry will also be of great importance in the reconstruction of that industry. This applies particularly to departments that prepare material for textile manufacturing, *e.g.*, the primary working up of raw material and cottonization (obtaining cottonine in the process of cottonizing fibres). The extensive use of chemical processes in leather manufacturing, particularly the adoption of 3-phase tanning, will likewise be an important factor in technical reconstruction. Vegetable tanning extracts are being displaced by cellulose-sulphate extracts and ordoval. This change is revolutionizing the material and technical basis of leather manufacturing. It accelerates the production cycle and reduces the cost of construction as well as of the tanning extracts themselves.

The completion of the technical reconstruction of light industry is being realized in the U.S.S.R. on the basis of attaining a high degree of concentration. This concentration is becoming more pronounced during the Second Five-Year Plan period because most of the new plants are vast combinations.

The construction of huge new combinations and the reconstruction of the present enterprises is raising the degree of concentration to the following levels:

Branches of Industry	1932		1937	
	No. of enterprises	Aggregate Capacity	No. of enterprises	Aggregate Capacity
Linen				
Spinning establishments of over 10,000 spindles	11	186,800 sp.	30	615,500 sp.
Percentage of total	27	55.3	58	87.7
Hemp				
Enterprises of over 10,000 tons output capacity	—	—	9	124,000 tons
Percentage of total	—	—	35	67
Shoe				
Enterprises of over 3,000,000 pairs output capacity	9	49 mill. prs.	26	135 mill. prs.
Percentage of total	11	49	26	71
Wool				
Spinning mills of over 7,000 spindles	8	96,500 sp.	18	201,000 sp.
Percentage of total	11.3	36	23	57.5
Weaving mills of over 150 looms	8	1,900 looms	18	6,200 looms
Percentage of total	12	26	23	57.5

Whereas in Great Britain in 1913 about 80 per cent of all spindles were installed in 595 purely spinning enterprises and more than 56 per cent of all looms were to be found in 859 purely weaving enterprises (Oldham and Bolton—purely spinning districts with more than 24,000,000 spindles; Burnley, Nelson and Blackburn—purely weaving districts), the U.S.S.R., profiting by the superiority afforded under planned economy, pursues the course of erecting spinning and weaving combinations and organizing special finishing departments for particular groups of spinning and weaving mills. The same type of combination will be built in the woollen and linen industries.

Maximum specialization of enterprises is another characteristic feature of the reconstruction of Soviet light industry. The plan for the development of the cotton industry provides that by 1937 no spinning mill in the old textile districts shall, on the average, produce more than 4 grades of yarn; no weaving mill, on the average, more than 2 grades of weaves and no finishing department, on the average, more than 7 grades of weaves. Cambric is made in Great Britain in 285 mills; shirting to be bleached, in 315 mills (coloured shirting in 200 mills). Other European manufacturers exhibit a still greater diversity of output. Many spinning mills in Germany manufacture up to 16 yarn numbers. In Switzerland there are mills which have only 350 looms but which until very recently manufactured 123 different grades of yarn.

As a result of the thorough-going reconstruction of Soviet light industry, the latter, by the end of the Second Five-Year Plan period, will overtake all countries of Europe and will occupy second place in the world in respect to capacity of production, volume of output, and technical and economic level.

FOOD INDUSTRY

THE food industry entered the Second Five-Year Plan period with its technical equipment renewed to a considerable extent. Completion of technical reconstruction in the food industry, further new construction and mastery of the new technique make it possible to plan that the output of the State food industry under the People's Commissariat of Supply and the Produce Procurement Committee of the Council of People's Commissars be increased to 14,370,000,000 rubles as against 5,660,000,000 rubles in 1932, or 253.9 per cent of 1932.

This considerable rise in the output of the food industry is to be secured by a marked increase in the gross amount of agricultural raw materials harvested.

In 1937 the gross amount of sugar beet produced will represent a value in fixed 1926-27 prices equal to 421.0 per cent of the 1932 production. For vegetable oil seeds the percentage will be 191.7, inclusive of 170.8 per cent for sunflower seed; for meats and fats it will be 234.9 per cent.

The raw material for the food industry is more than doubling in value during the Second Five-Year Plan period. The increase in the gross amount of sugar beet produced enables the country to more than triple the output of granulated sugar in comparison with the output for 1932. This will be accomplished by augmenting the quantity of raw material and by increasing the sugar extracted from 13.1 per cent to 14.0 per cent in 1937.

The increased production of oil-bearing seeds ensures an almost 2-fold increase in the output of the vegetable oil industry.

The gross amount of tobacco produced fully satisfies the demands made on the tobacco industry which is increasing its output of cigarettes from 67,000,000,000 in 1932 to 125,000,000,000 in 1937; and of makhorka tobacco—from 3,274,000 cases to 6,000,000 cases.

The increased grain, potato, fruit and vegetable crops provided for under the Second Five-Year Plan ensure an ample sup-

ply of necessary raw materials for the other branches of the food industry.

In conformity with the directives of the Seventeenth Congress of the Communist Party to ensure the toilers a 2 to 3-fold increase in the supply of the principal consumers' goods including foodstuffs, the Plan provides that in several important branches of the food industry the planned output be increased 2.5 to 3 times. The greatest rates of increase have been set for the sugar, canning and meat industries, and the manufacture of wheat flour, macaroni, confectionery, soap and tea.

The following figures give the increase in individual products:

	1932	1937	1937 in % of 1932
Meat (thousand tons)	435.0	1,200.0	275.9
Granulated sugar (million centners)	8.28	25.0	302.2
Wheat flour (thousand tons)	3,089.0	9,700.0	314.1
Canned goods (million cans)	716.0	2,000.0	279.3
Macaroni (thousand tons)	185.5	510.0	274.9
Soap (thousand tons)	357.2	1,000.0	280.0
Confectionery (thousand tons)	548.0	1,350.0	246.3

The Second Five-Year Plan also specifies high rates of development for the branches of industry producing *edible fats*. In 1937, 130,000 tons of butter will be produced in the creameries of the People's Commissariat of Supply as against 56,200 tons in 1932. The increase in whole milk products used solely to meet the demand of the big proletarian centres is still more considerable. The quantity of whole milk products put out by the enterprises under the People's Commissariat of Supply is increasing from 49,200 tons in 1932 to 350,000 tons in 1937 (a more than 7-fold increase).

At the end of the first quinquennial period, the output of the vegetable oil industry is scheduled to rise to 750,000 tons, an increase to 183.0 per cent of the 1932 output.

The oleomargarine industry is raising its output to 120,000 tons in 1937, or to 310.9 per cent of its 1932 level; four new oleomargarine factories are being put into operation.

The output of edible fats as a whole is growing in value from 440,000,000 rubles in 1932 to 1,085,000,000 rubles in 1937, which constitutes 246.6 per cent of the 1932 value.

Allowing for changes in assortment *the meat, poultry and fish* industries are increasing their output from 1,014,600,000 rubles in 1932 to 2,914,000,000 rubles in 1937, *i.e.*, an almost 3-fold increase.

While the food industry under the People's Commissariat of Supply shows a rise to as much as 256.1 per cent of 1932, the foodstuffs and edible fats group is growing to 275.1 per cent of 1932. The stress laid on the branches that turn out foodstuffs and edible fats represents the most striking feature of the food industry's Five-Year Plan. Improvement in quality of output is another keynote in the industry's program of development.

The proportion of high-grade products, of the tastier and more nutritious kinds of foodstuffs, is sharply increasing in the decisive branches of the industry.

In the meat industry the proportion of pork, sausage, canned meats and edible fats is on the increase.

STRUCTURE OF MEAT OUTPUT
(in thousand tons)

Kinds of meat	1932	Percentage of total	1937	Percentage of total	1937 in % of 1932
Total	435.0	100.0	1,200	100.0	275.9
comprising:					
Beef	322.0	74.0	470	39.17	145.9
Pork	33.0	7.7	580	48.33	1,757.5
Mutton	80.0	18.3	150	12.50	187.5

While the output of the meat industry as a whole shows an increase to 275.9 per cent of 1932 the output of pork—the more nutritious kind of meat—will exhibit a 17.5-fold increase in comparison with 1932. In 1937 the share of pork in the total meat output will constitute 48.3 per cent as against 7.7 per cent in 1932. The manufacture of meat products is growing apace. The output of sausage is rising from 59,000 tons in 1932 to 160,000 tons in 1937 (a more than 2.7-fold increase); that of edible fats—from 13,000 tons in 1932 to 63,000 tons in 1937, or a 4.8-fold increase.

The variety of canned meat products is growing because American-type canned meats (roast beef, corned beef) are being included. The qualitative improvement in the manufacture of sausage is still greater. In 1932, 75-80 per cent of all sausage manufactured was of lower grade (soft bologna and boiled sausage), the higher grade products constituting only 15-20 per cent. In 1937, the latter will constitute 60 per cent and the former will drop to 20-25 per cent of the total sausage produced, while the absolute increase in the total output will be 2.7-fold.

The Plan specifies a considerable increase in the output of high-grade bacon and ham.

The output of edible fats directly used in food is increasing 4.9-fold; of albumin and dried blood—5-fold; of meat-and-bone dust—6.3-fold.

In the fish industry the Plan provides for a sharp increase in fresh and frozen fish accompanied by a simultaneous decrease in the proportion of salt fish.

By 1937 the salting of high-grade fish which was extensively practised during the first years of the First Five-Year Plan period will have been discontinued thanks to the development of a system of cold-storage plants.

Classification of products	1932	Percentage of total	1937	Percentage of total	1937 in % of 1932
Total fish output (thousand tons)	957.0	100.0	1,400.0	100.0	146.2
of which:					
Fresh and frozen	297.4	31.1	546.0	39.0	183.6
Specially pickled	—	—	62.3	4.4	—
Smoked	17.7	1.8	58.4	4.1	330.0
Dried and jerked	12.4	1.3	14.1	1.0	113.0
Salted (thousand tons)	570.1	59.6	561.0	40.2	98.4
Canned goods (thousand tons)	28.2	2.9	105.0	7.5	372.3
Canned goods (million cans)	100.3		300.0		300.0
Miscellaneous products: fish flour, fats, fertilizer, glue, etc. (thousand tons)	31.2	3.3	53.2	3.8	170.5

The increase in fresh and frozen fish is to be paralleled by a considerable increase in smoked fish. Salt fish is being replaced by fresh-frozen and smoked fish. The changed method of curing fish will improve the quality of output and will ensure an increase in the output of fish products.

The *canning industry* is planning a 2.9-fold increase in its output during the Second Five-Year Plan period. Canned fruit, condensed milk and canned vegetables will exhibit the greatest increases. The quantitative increase is accompanied by a decided improvement in assortment and in the quality of canned products.

In the *confectionery industry,* quality and assortment of output must be sharply improved by manufacturing more soft candy, marmalade, *khalva* and jam, while the total output of the industry is to grow 2.5-fold.

During the Second Five-Year Plan period the *macaroni indus-*

try is tripling the percentage of high-grade products besides improving quality of output in general.

Improvement in the technological process of *cereal* manufacturing on the basis of applying the latest achievements of foreign technique, the production of new kinds of cereals—American corn flakes and puffed rice—and the treatment of barley and oats for the manufacture of high-grade cereals increase the supply of cereal products and at the same time enrich it with more nutritious and readily digested products.

The *flour* industry is considerably increasing the variety and improving the quality of its products. The following data characterize the changes in the milling of wheat flour:

Grades of wheat flour	1932		1937	
	1,000 tons	Percentage of total	1,000 tons	Percentage of total
72-75% of milling . .	417.0	13.5	4,200.0	43.3
80-85% of milling . .	1,392.0	45.1	5,000.0	51.5
96% of milling . .	1,280.0	41.4	500.0	5.2
Total	3,089.0	100.0	9,700.0	100.0

The proportion of high-grade flour (65-75 per cent) in the total flour output (rye and wheat) will constitute 41.3 per cent in 1937 as against 7.8 per cent in 1932—a 5.3-fold increase.

So considerable an increase in the production of high-grade flour makes it possible to meet all the requirements of the confectionery and macaroni industry and to effect a decided improvement in the quality of their output.

At the present time there are 132,000 rural flour mills. They are mainly wind mills (63 per cent) representing a daily capacity of 254,000 tons. Roller mills account for only 28.3 per cent of the total output.

All rural flour mills are under the control of local bodies. The management of these mills must be decentralized as far as possible by attaching each mill to a definite collective farm.

The reconstruction of the collective farm mills during the Second Five-Year Plan period must proceed along the line of replacing the present primitive equipment by roller mills and by building new mills.

The Plan provides for a change in favour of securing a maximum of high-grade flour.

The technical reconstruction of the flour industry establishes

all the necessary prerequisites for improving the quality and variety of flour. This in turn enables the *baking industry* considerably to increase the output of its fancy and most wholesome products. In 1937 wheat bread will constitute 70 per cent of all bread consumed in the cities. Bread baking in forms is being replaced by baking on the hearth. The output of high-grade products such as buns is multiplying 10-fold in comparison with 1932. The quantity of rolls and small loaves is greatly increasing.

In addition to the increase in high-quality bread, the proportion of the better grades of bread (Ukrainian and Riga bread) is notably increasing within each category with a corresponding decrease in the amount sour black bread produced. In quality and assortment, baking products must suit the tastes and meet the requirements of the consumers. The total amount of bread baked (under the All-Union Co-operative Association) is increasing from 7,000,000 tons in 1932 to 10,500,000 tons in 1937, an increase to 150 per cent of the former figure.

The forced development of *tea* plantations during the period of the Second Five-Year Plan and the increased yield will raise the output of domestic black Bohea teas to 11,800 tons in 1937 as against 375 tons in 1932, a 31.5-fold increase. The total amount of tea consumed will be 70,000 tons in 1937 as against 13,000 tons in 1932, *i.e.*, it will multiply 5.4-times. The per capita tea consumption will reach 391 grams in 1937 as against 116 grams in 1932. The variety of teas is increasing considerably. The proportion of black Bohea teas is increasing to 69.3 per cent as against 45.7 per cent in 1932 and 49.2 per cent in 1913 while the percentage of lower-grade teas is correspondingly decreasing.

The Five-Year Plan for the *meat industry* specifies that the primitive slaughterhouses be replaced by meat-packing plants while in certain districts the existing slaughterhouses are to be reconstructed. The First Five-Year Plan period witnessed the erection of 10 meat-packing plants of European type and the radical technical reconstruction of 18 old abattoirs in which fat, sausage and other departments were set up. Of the 40 meat-packing plants under construction, 21 plants representing a capacity of approximately 441,900 tons are being opened for operation during the Second Five-Year Plan period. By the end of this period, 75 per cent of the meat output will be dressed and worked up in new meat-packing plants which greatly increase the edible meat dressed out from cattle on the hoof.

The new American-type meat-packing plants are of a higher category than the present plants. The former are run by applying a continuous technological process in correct sequence, thus ensuring the most rational slaughter of cattle and the complete working up of the raw material into meat products, technical products and special manufactures. The coefficient of utilization in the meat industry is rising during the Second Five-Year Plan period from 66 per cent to 80 per cent of the weight of cattle.

The basis of the packing plants under construction consists in a conveyor system which comprises the processes of dressing meat and working up meat products within each department. All the principal processes are being mechanized as far as possible; machinery is being rendered automatic and electricity is being extensively introduced.

In the course of the First Five-Year Plan period *canning* was transformed from a semi-handicraft industry into a large-scale industry. By the end of the Second Five-Year Plan period technical reconstruction in the canning industry will be completed and operations will start in 23 new establishments having a capacity of up to 443,000,000 standard cans and 1,250 tons of powdered milk, which will increase the capacity of the canning industry under the Chief Canning Board by 45.3 per cent.

The Soviet canning industry is the most concentrated in the world. The average output capacity per enterprise in the U.S.S.R. (20,000,000 cans as of January 1, 1933) is almost 3 times that in the United States (approximately 7,000,000 cans).

The canning industry of the U.S.S.R. which has been making use of the technical achievements of the American canning industry—the foremost in the world—has as a result of the fulfilment of the First Five-Year Plan already outdistanced the capitalist countries of Europe in level of technique. In all canning factories built during the First Five-Year Plan period the production process has been completely mechanized and the conveyor system installed. The factories have been equipped with high-speed can-making equipment turning out up to 300 cans a minute, automatic filling machines having a capacity of 100-120 cans a minute, can-seaming machines which deliver up to 150 finished cans a minute, sterilization equipment provided with continuously operating autoclaves, etc.

In the canning industry the Second Five-Year Plan period is faced with the task of mechanizing a number of laborious pro-

cesses which are still performed by hand (the cleaning of vegetables, a number of processes in dressing and curing fish and meat). With the starting of operations in a number of new enterprises and the further reconstruction of old plants, the technical reconstruction of the canning industry will be completed.

The growth of the canning industry under the Second Five-Year Plan makes the extensive use of glass containers imperative so as to minimize the industry's consumption of tin, a scarce product. The Plan provides for the completion of a glass container works which will have a capacity of 75,000,000 jars, and for the building of a new glass container works with a capacity of 35,000,000 jars.

The Second Five-Year Plan completes the process of technical reconstruction in the principal fishery districts and maps out decided progress for districts less or scantily supplied with water so as to improve the quality of work of the State fisheries and the fishermen's co-operatives, securing the mastery of the new technique by these organizations and improving the quality and assortment of output.

The re-equipment of the fishing industry ensures an increase in the proportion of mechanized fishing which will reach 70 per cent of the fish caught by State operated fishing, inclusive of 47 per cent for trawling. It also gives rise to a new geographic distribution of the fish industry in which the relative importance of ocean fishing will be enhanced.

In the *fish dressing and curing* industry, operations will be started at 6 fish combinations, 2 salting and cold storage combinations, 4 fish-canning factories and 4 new cold-storage plants.

By extensively introducing the best models of technique into the State fish industry and giving technical leadership to the fishermen's co-operatives, the possibility of overtaking the fish industry of the advanced capitalist countries in general level of technical equipment during the Second Five-Year Plan period has been assured.

The considerable improvement in the quality of output of the food industry and in the assortment offered is to be accompanied by the extensive use of *artificial refrigeration* which is of great importance in the preservation of perishable foodstuffs. Artificial refrigeration is to be applied from the time products are procured until they are consumed (meat, poultry, game, fish, eggs, dairy products, oleomargarine, fruit, berries, etc.).

The plan for capital investments for the individual branches of the food industry during the Second Five-Year Plan period provides that refrigeration departments be built at various industrial plants (meat-packing plants, fish and egg-and-poultry combinations, dairies, oleomargarine and other factories) as well as a number of independent cold-storage plants in centres of consumption and refrigeration departments in central kitchens, stores, etc.

Besides, a considerable increase in refrigeration facilities has been planned for the transportation system (refrigerator cars, boats and trucks).

The outlined volume of capital investments in the cold-storage industry ensures the preservation of flavour and nutritive value and at the same time will eliminate the seasonal character of the consumption of certain readily perishable products. For the purpose of creating the best conditions for the thermic treatment of perishable products, the Plan provides for the extensive application of the latest achievements in rapid and thorough refrigeration at chilling temperatures, as these achievements afford great advantages in the preservation of the nutritive value and quality of the products.

In order that full use may be made of the refrigeration facilities of the cold-storage plants and departments, it is planned to develop extensively the manufacture of ice as well as of ice cream and fruit ice.

Under the Second Five-Year Plan the cold storage space will be doubled by new large-scale construction which will add 99,000 tons to the present storage space.

In accordance with the projected increase in cold-storage space it is planned to invest 200,000,000 rubles in refrigeration during the Second Five-Year Plan period, which contrasts with the 67,000,000 rubles expended for this purpose by the Central Refrigeration Board during the First Five-Year Plan period.

In the *flour* industry, numerous technically backward, small-scale rural flour mills are to undergo extensive reconstruction in addition to the construction of huge milling combinations.

In degree of concentration and mechanization, *bread baking* is one of the most advanced branches of the Soviet food industry. By the end of the First Five-Year Plan period the U.S.S.R. had outdistanced the capitalist countries in bread factory capacity. The Ward Baking Company, the biggest American bread bakery,

has a daily capacity of 180 tons, while the daily capacity of the automatic bread factories Nos. 7 and 8 in Moscow is as much as 280 tons each.

The proportion of mechanized bread baking rose during the course of the First Five-Year Plan period from 21 per cent in 1928 to 68 per cent in 1932.

In 1932 automatic bread baking constituted 17 per cent of all mechanized bread baking. In mechanizing bread baking and rendering it automatic, the Soviet Union is not only making use of the achievements of capitalist technique, primarily that of the United States, but goes considerably beyond this by setting up a new system of automatic bread factories superior in type to those of Europe or America. In the Marsakov type of bread factory. all processes—from pouring the flour to delivering the finished loaf—are completely mechanized.

During the period of the Second Five-Year Plan, new automatic bread factories are being built in addition to completing the mechanization of bread baking in the main.

In the *vegetable oil* industry, 3 of the 19 new factories were started at the end of the First Five-Year Plan period. Nine of the 16 factories on which construction is to be begun have been allotted to the East. Large-scale machine production will be established in the vegetable oil industry during the Second Five-Year Plan period by introducing the most efficient method of production, *i.e.*, extraction.

While the capacity of the vegetable oil industry is increasing 35.8 per cent, the proportion of raw material treated by the extraction method is increasing from 0.8 per cent in 1932 to 24.0 per cent in 1937. The extensive introduction of extraction yields considerable economies in power and raw material in comparison with the present method of pressing the oil seeds; extraction triples the productivity of labour and increases the yield of oil.

In the *soap* industry, it is planned not only to provide the population with a quantitatively fully adequate supply of hard, including toilet, soaps, but, what is particularly important, to effect also a decided improvement in the quality of soap.

The manufacture of soap of less than 40 per cent fatty matter content has been discarded by the Plan, while the output of high-quality (60 and 50 per cent) soap will multiply 6-fold in 1937 in comparison with 1932 and that of 40 per cent soap will multiply 1.7-fold. The production of toilet soap is increasing 3.5 times.

Besides, the soap industry during the Second Five-Year Plan period is proceeding for the first time to put out a new kind of raw material necessary in soap making—synthetic acids manufactured from Solar oils and other kinds of mineral oil products. By organizing the manufacture of this product it becomes possible by the end of the Second Five-Year Plan period to release a considerable quantity of edible vegetable oils for the needs of the food industry.

Under the Second Five-Year Plan the total volume of capital investments for the People's Commissariat of Supply has been set at 5,340,000,000 rubles as against 1,858,000,000 rubles under the Plan for the first period; investments under the Produce Procurement Committee (flour and cereal industry) total 515,000,000 rubles as against 153,000,000 rubles during the First Five-Year Plan period.

Expenditures for new construction (exclusive of reconstruction) total 2,820,000,000 rubles (52.6 per cent of the total sum invested), inclusive of 1,220,000,000 rubles for the completion of enterprises the construction of which was begun in the First Five-Year Plan period.

In accordance with the planned allotment of capital investments, the following increase in capacity is contemplated for the principal branches of the industry:

Branches of industry	As of Jan. 1, 1933	As of Jan. 1, 1938	1937 in % of 1932
Granulated sugar (thousand centners of sugar beet processed daily) .	1,086	1,537	141.5
Vegetable oil (thousand tons) . . .	600	815	135.8
Alcohol (thousand decalitres per annum all systems)	53,700	80,000	149.0
Cold-storage plants (space in thousand tons under Central Refrigeration Board)	80.9	180	222.5

The greatest increase has been assigned to the cold-storage industry, on the development of whose network the quality of output to a considerable degree depends.

Capacity is also being increased by the application of a number of measures rationalizing the process of production and by changing the grades of raw material used. Thus in the alcohol industry, the replacement of grain and potatoes by chicory makes possible an almost 2-fold increase in the use factor of the industry's technical base. In the sugar industry the application of beet

drying and other methods of beet preserving is permitting the sugar refineries to lengthen their working season to a considerable extent.

The reconstruction of the confectionary industry will ensure a decrease in production costs and an improvement in the quality of output.

The mastery of advanced technique in the food industry must manifest itself first and foremost in increased utilization of equipment and in improved production indices. This appears from the following data:

Indices	1932	1937
Load per trawler (thousand centners)	12.0	18.0
Total yield in the meat industry, including every kind of product (in %)	66.0	80.0
Sugar yield (from beets, in %)	13.1	14.0

A considerable change in the direction of increased yield of output accompanied by a simultaneous improvement in quality has also been planned for the remaining branches of the food industry.

The completion of the food industry's technical reconstruction during the Second Five-Year Plan period provides the conditions necessary to increase the industrial processing of the waste products of the food industry to be supplied to agriculture. This finds expression in the rapid tempo at which the combined fodder industry is growing. As a result of the completion of technical reconstruction under the Second Five-Year Plan, the U.S.S.R. is capturing first place in Europe in the volume of output of its food industry.

In 1937 the U.S.S.R. will occupy first place in the world in flour milling, while its canning industry will be surpassed only by that of the United States, and its fishing industry (raw fish) by that of Japan. In 1937 the U.S.S.R. will produce more frozen fish than Great Britain, Norway and Germany put together. The U.S.S.R. will have 2.5 times as great a volume of canned fish products as Norway and about 40 per cent of that of the United States.

During the Second Five-Year Plan period the U.S.S.R. is outdistancing Germany in volume of output of the sugar industry, the respective figures being 2,500,000 tons for the U.S.S.R. in 1937 and 1,980,000 tons for Germany in 1929-30. In this field the U.S.S.R. is capturing first place in Europe and second place in the world.

LOCAL INDUSTRY AND HANDICRAFT CO-OPERATIVE ORGANIZATIONS

DURING the Second Five-Year Plan period local industry and handicraft co-operative organizations are undergoing vast development, particularly in the production of manufactured articles for general consumption. In this period the output of consumers' goods by local industry is multiplying 3 times; rising from 1,105,000,000 rubles in 1932 to 3,320,000,000 rubles in 1937 (in 1926-27 prices). This sum does not include the output of the enterprises of the industrial People's Commissariats that are being transferred to the jurisdiction of local bodies inasmuch as the process of transfer has not yet been completed.

The enterprises of local industry are developing their work principally by mobilizing additional local sources of raw material, by extending their own output and procurements of all kinds of local raw materials; also by maximum utilization in local production of the waste products of large-scale industry.

It is the principal task of local industry to satisfy in the first place local demand and local requirements. Therefore in the manufacture of consumers' goods local industry must keep in close touch with local consumers' needs, with special local conditions, must give the closest attention to the individual demands of the general consumer.

Industries under district bodies occupy a special place in local industry. District industry must develop most rapidly at remote points in the interior by relying on the use of local raw material in the manufacture of products intended to meet the growing demand of the collective farmers as well as in selling their products on the city markets.

While developing the manufacture of consumers' goods at a particularly rapid rate, local industry, which is a very important supplementary factor of large-scale industry, must also extensively develop the manufacture of equipment required in construction for local industry, local transportation and social and cultural purposes. Local industry must develop the extraction of all

kinds of local fuel and the production of building materials, equipment for municipal services and special equipment, of instruments, tools and simple, small apparatus and of certain machine parts for local industrial enterprises.

Repair work must increase in importance in local industry. It is necessary to develop repair bases and workshops for the repair of machines, transportation and hauling equipment, etc. The main line pursued by the Plan for the development of local industry during the Second Five-Year Plan period consists in working for the maximum satisfaction of local requirements by means of local production within the respective regions and districts.

Handicraft co-operative organizations are developing at a rapid pace during the years of the Second Five-Year Plan.

During this period the handicraft co-operative organizations must complete the process of uniting the artisans of town and country. The number of persons engaged in the various handicraft co-operative industries must exhibit the following rates of growth:

Average Number of Persons Employed According to Category of Co-operative Organization

(thousand persons)

	1932	1937	1937 in % of 1932
All-Union Council of Handicraft Co-operative Societies	1,329	1,820.0	136.9
All-Union Association of Timber Handicraft Co-operative Societies	370	510.0	137.8
Invalids' co-operative organizations	132	190.0	143.9
Total	1,831	2,520.0	137.6

This planned increase in the number of co-operative handicraftsmen in conjunction with a 45 to 50 per cent rise in the output per handicraftsman for the Five-Year Plan period will result in a growth of output by 1937 to a total value of 13,970,000,000 rubles (in 1932 prices) as against 6,976,600,000 rubles in 1932, or 200.2 per cent of the latter. If consumers' goods are calculated separately, the corresponding increase will be from 3,495,600,000 rubles to 9,415,000,000 rubles, or 269.3 per cent of the former. The most important branches of handicraft co-operative industry exhibit the following development in volume of output (in million rubles, in 1932 prices):

Industries	1932		1937		1937 in % of 1932	
	Total output	Of which: output of consumers' goods	Total output	Of which: output of consumers'goods	Total output	Output of consumers'goods
Metal working . .	694.9	225.3	1,260.0	860.0	181.3	381.7
Chemical	260.8	172.0	560.0	435.0	214.7	252.9
Wood-working . .	668.6	296.0	1,320.0	940.0	197.4	317.6
Leather, footwear and fur	752.1	576.0	1,170.0	1,120.0	155.6	194.4
Fancy articles . .	224.7	185.5	580.0	560.0	258.1	301.9
Cultural supplies .	182.8	129.0	500.0	430.0	273.5	333.3
Food	979.1	979.1	2,473.0	2,473.0	252.6	252.6

During the Second Five-Year Plan period the handicraft co-operative organizations must concentrate on increasing the production of manufactured articles of general consumption, and meet in the first place the growing individual demands of the general consumer for better quality in the sewing of garments and shoes, in the manufacture of household goods and of objects of art produced by handicraft industry. The handicraft co-operative organizations must pay particular attention to supplying the collective-farm countryside with handicraft products.

The production of all kinds of articles for cultural purposes, of toys, musical instruments, sporting goods and of radio, photographic and school supplies is being accelerated.

The number of metal shops must be greatly increased. Small establishments working up agricultural products (fruits, vegetables, dairy products), whether they are mechanized or semi-mechanized or use hand labour, must be further developed.

In the textile industry, the handicraft co-operative organizations must develop hemp-processing and knit-goods producing shops.

In the leather and shoe industries it is planned to expand the shoe repair service and increase the output of leather goods for rural requirements (saddles and harnesses, fur coats, mittens) coupled with the extensive use of new kinds of leather raw material to be secured largely from local resources.

The handicraft co-operative organizations must supplement

the basic public catering organizations by enlarging their network, concentrating on non-industrial districts, extending their activities to the countryside and to districts where the public catering network of the corresponding organizations of the People's Commissariat of Supply and of the All-Union Co-operative Organization are poorly represented.

With reference to the source of raw material the Plan specifies that in addition to the State raw material quotas the handicraft co-operative organizations are to develop on a vast scale their own local procurements of agricultural raw material and of industrial waste products, while extensively exploiting the local sources of raw materials and introducing new kinds of raw material into handicraft production.

During the Second Five-Year Plan period the technical base of local industry is strengthening considerably. Up to 2,000,000,000 rubles are being invested in local industry producing consumers' goods during the years of the Second Five-Year Plan. This ensures the extensive construction of new enterprises for local industry and the reconstruction and extension of many thousands of handicraft establishments in operation.

Of these investments 850,000,000 rubles have been appropriated for the development of handicraft co-operative organizations while the bulk of construction (involving more than 90 per cent of the total capital investment) has been allocated to the expansion of lines of production manufacturing articles for general consumption and meeting the demands of the market.

AGRICULTURE

I

THE Second Five-Year Plan for the development of agriculture is a plan for the completion of the socialist reconstruction of agriculture, for the absolute completion of collectivization and the final abolition on this basis of the kulaks (rich peasants) as a class.

The further growth of industry under the Second Five-Year Plan creates all the conditions necessary for completing in the main the mechanization of agriculture, which in conjunction with the extensive application of scientific agricultural methods will ensure the shift of socialist agriculture to rational, scientific farming. On this basis the tempo of agricultural development is gathering considerable speed. In its rate of development agriculture is approximating the rate of development of industry, is finally overcoming its lag, while the standard of living of the collective farmers is rising to that of well-to-do husbandmen.

The main roads that lead to the accomplishment of these tasks are: strengthening the role of the State farms as models of large-scale machine production, inclusion of all collective farms in the service supplied by the machine and tractor stations, consolidation of the collective farms organizationally and economically, socialist re-education of the collective farmers by strengthening socialist labour discipline and hence transformation of all toilers in the villages into active builders of classless, socialist society.

As early as the first year of the Second Five-Year Plan period the organization of political departments on the State farms and in the machine and tractor stations, and the success scored by them in the struggle to transform the collective farms into Bolshevik farms, to set up genuinely socialist labour discipline, the further aid granted to the countryside in the form of tractors and agricultural machinery, the transition from the contractation system to the obligatory delivery of grain, meat and milk to the State, and the increased material interest of each collective farmer in collective production greatly enhanced the collective farmers' activity in production and resulted in the further organiza-

tional and economic consolidation of the collective farms. This has ensured a decided rise in crop yield and in the gross amount of grain harvested, and has led to considerably greater incomes for the collective farmers than in the preceding years. The new victories of the collective farms have given rise to new entries *en masse* of individual farmers into these farms. The percentage of collectivized farms has grown from 60.8 on October 1, 1932 to 68.9 on January 1, 1934. The Plan provides that by the end of the Second Five-Year Plan period the enrolment of all toilers of the countryside in collective farms is to be completed.

The machine and tractor stations play a decisive role in the consolidation of the victory of the collective farm order.

The rapid development of socialist industry—the basis for the great increase in the number of tractors and automobiles of the machine and tractor stations as well as in the number of modern agricultural machines and implements—makes it possible to multiply the number of machine and tractor stations 2.5 times during the period of the Second Five-Year Plan, so that the machine and tractor stations will be able to serve all collective farms. All the main categories of modern technical means of agricultural production have been concentrated in the machine and tractor stations, the capacity and value of their dead stock considerably surpassing that of the collective farms.

During the period of the First Five-Year Plan the machine and tractor stations became the basis for the machine technique of the collective farms, the foundation for raising the productivity of collective farm labour and expanding collective farm production.

During the years of the second quinquennial period the machine and tractor stations are gaining considerably in importance. They are becoming the direct organizers and managers of the entire collective farm production; they play the chief part in the socialist re-education of the collective farmers and in the strengthening of socialist labour discipline on the collective farms by the introduction of modern machine technique.

The considerable increase in the technical equipment of the machine and tractor stations makes it possible to reinforce their leading and organizational role in completing the shift of collective farm production to rational, scientific farming and socialist labour discipline. The machine and tractor stations must head the struggle for the training of cadres of collective farmers, tractor drivers, combine operators and skilled personnel for the complex

agricultural machines; they must also complete the transplantation to agriculture of industrial forms of organization of production. In guiding collective farm production the machine and tractor stations must take as their points of departure the need to consolidate the basic form of collective farm production—the artel,[1] the firm application of the principle of distributing the income of the collective farms according to quality and quantity of labour expended by the collective farmers, the forced development of the collective stock farms and their high productivity, the aid to be extended to all collective farmers in providing them with cows and small stock and the radical improvement in the standard of living of the collective farmers.

The Second Five-Year Plan enhances the role of the State farms as models of socialist organization of production and of the application to agriculture of the latest achievements in machine technique and of modern scientific farming and stocking-raising.

The most important, the decisive task confronting the State farms during the Second Five-Year Plan period is that of mastering their tremendous fixed capital. The completion of the organizational and economic consolidation of the State farms, particularly by partitioning them and discontinuing excessive specialization, the strengthening of socialist labour discipline, the extensive development of socialist competition and shock brigade work, the careful handling of machines and tractors and the most productive utilization of this machinery, absolute compliance with all the requirements of modern scientific farming and stock-raising in the struggle for increased production, for a considerable rise in yield and in the qualitative indices of stock-raising will ensure the transformation of all State farms into models of advanced technique in agricultural production, will render the State farms highly productive and highly remunerative enterprises.

The State farms are not only huge producers of grain and meat but also represent an important factor for raising the yield and the productivity of cattle, and for introducing high qualitative standards of production in all agriculture. Accordingly the

[1] Co-operative associations for the joint tillage of land are organizations in which the means of production are not socialized but in which the land is cultivated by the joint labour of the members of the association.

Agricultural *artels* socialize the basic means of production: labour, land, machinery and implements, work animals, farm buildings. Land adjoining the homes (small garden and vegetable plots), dwellings, a certain part of dairy cattle, hogs, sheep, poultry, etc., are not socialized.

In agricultural communes all the means of production as well as of distribution are socialized.

State farms must widely develop seed production, must particularly develop the propagation of new strains of seeds on a scale that will guarantee their mass use in production.

Being the principal reproducers of high-grade materials raised in seed selection stations, the seed-producing State farms will supply a vast initial fund of pure-bred seeds and will make it possible by the end of the Second Five-Year Plan period to change the grade of seeds on 75 per cent of the grain-growing area and on the whole area sown to the principal industrial crops.

The State stock farms on which a considerable portion of the pure-bred cattle is concentrated must become the main source for cross-breeding collective farm cattle, for raising on this basis their breed and their milk and meat yields, and improving the quality of wool. The State stock farms must likewise afford aid to the collective stock farms—the best form in which to develop stock-raising on collective farms—by selling grown-up and young stock to these farms and thus replenishing their herds.

During the years of the Second Five-Year Plan period agriculture is becoming wholly the domain of the State and collective farms. Only the private cattle of the collective farmers and their small individual garden plots will not be comprised in the direct forms of organization of large-scale socialist agriculture, although even these will be under its immediate influence. The output of the State and collective farms will constitute (in value) 75 per cent of the total agricultural output and 91.5 per cent of field crops.

The consummation of complete collectivization and in the main of mechanization in agriculture together with the considerable increase in the productivity of labour fully ensure the realization during the Second Five-Year Plan period of J. Stalin's slogan that the collective farmers are to be raised materially to the level of well-to-do husbandmen.

Comparative Assets of Collective Farmers in 1937 and of Well-To-Do Individual Farmers in 1927 (in 1926-27 prices, in per cent)

Classification	Sowing area per capita	Basic means of production per ha. of sowing area	Gross per capita output	Net per capita income
Well-to-do farms (census of 1927).	100	100	100	100
Assets of collective farmers in % of assets of well-to-do farmers.	100	118	114	145

Under the Second Five-Year Plan, the collective farmers will rise above the level of the well-to-do farmers in 1927 with respect to volume of means of production, gross and net income and the productivity of labour. When comparing the value of the principal means of production constituting the collective farmers' equipment with the value of those possessed by the former well-to-do farms, it is indispensible that the considerably higher technical level of the means of production of the collective farms be taken into consideration. On the collective farms labour will in the main be mechanized, equipped with modern advanced technique, whereas on the well-to-do individual farms labour performed with the aid of horse-drawn implements predominated.

During the years of the Second Five-Year Plan period the collective farms are becoming highly productive enterprises whose quite profitable character finds expression in the fact that all collective farm members are being adequately supplied with the means of production necessary to effect a considerable rise in their living standard and create large food and raw material resources for both town and country.

II

The transformation of the whole of agriculture into large-scale socialist farming, the considerable improvement in quality and productivity of State and collective farm labour, the mastery of machine technique and scientific large-scale farming ensure such rates of increase of agricultural output as will solve the grain problem completely and the stock-raising problem in the main within this Five-Year Plan period, and will set up a powerful raw material base for light industry and the food industry.

In 1937 the gross output of agriculture will reach 26,160,000,000 rubles (in 1926-27 prices) as against 13,070,000,000 rubles in 1932, inclusive of an increase in the value of livestock products from a total of 3,200,000,000 rubles to a total of 7,100,000,000 rubles. This, if the natural increase of the herd is included, represents an increase in the total of from 3,300,000,000 rubles to 8,000,000,000 rubles, giving an average annual rate of increase of 14.9 per cent which is far above the rate of increase of production in the capitalist countries. Thus, for instance, the average annual increase in Germany's agricultural output during the period when German capitalism experienced its swiftest rise—from 1860 to 1913—was about 2.5 per cent, while the increase

in the agricultural output of the United States during the period of "prosperity" was 1.7 per cent.

The rapid growth of agricultural output is accompanied by a considerable improvement in its quality. This finds expression in improved quality of grain and grades of flax, in increased length of cotton fibre, increased fattening of stock, etc., as a result of which the rates of increase in output of the corresponding branches of economy are higher when calculated in value than their rates of increase when expressed in physical quantities.

Output of 1937 (in % of 1932)

Crops	In physical quantities	Value in fixed 1926-27 prices
Grain crops	150.0	158.7
of which:		
Wheat	186.9	198.0
Cotton	167.3	178.2
Flax fibre	160.0	165.2

The increase in output of socialist farming will promote the U.S.S.R. to first place in the world in the production of the principal grain crops and of sugar beet, and to third place (after the United States and India) in cotton growing.

Place Occupied by U.S.S.R. in World Output of Principal Agricultural Products

Classification	1928	1932	1937
Wheat	2	2	1
Barley	2	2	1
Oats	2	2	1
Unginned cotton	5	4	3
Flax fibre	1	1	1
Sugar beet	2	2	1
Horses	1	1	1
Cattle	2	4	3

[1] The level of the U.S.S.R. in 1932 and 1937 resp. is compared with that of the capitalist countries in 1928-29.

One of the most important aims of the Second Five-Year Plan is the final solution of the grain problem, the attainment of high and stable crop yields and the increase in the amount of grain harvested to 1,048,000,000 centners.

The projected volume of grain production makes it possible to raise the average per capita rate of consumption of grain by 20 per cent and to raise the grain consumption for cattle forage to 320-350,000,000 centners, while at the same time increasing

stocks and reserves (Government and collective farm) by the end of the Second Five-Year Plan period to 49,100,000 centners.

The transformation of the whole of agriculture into large-scale socialist farming, the increase in agricultural output and the considerable improvement in the material welfare of the collective farm masses lead to a further growth of commodity production in agriculture.

Products	Commodity production in agriculture		
	1932	1937	1937 in % of 1932
	(million tons)		
Grains	19.85	34.5	173.8
Potatoes	8.98	16.4	182.5
Truck garden products	4.19	8.7	208.1
Meat	0.93	2.5	265.7
Milk and dairy products	4.09	9.6	235.7

In the entire mass of commodity production there is a notable increase in the share supplied by the State farms of all systems, particularly commodity production of vegetables, meat and milk.

The great increase in tractor work performed by the machine and tractor stations on the collective farms is raising the total amount paid in kind by the collective farms for the work of the machine and tractor stations from 2,500,000 tons in 1933 to 12-12,500,000 tons in 1937, *i.e.*, to 80 per cent of the grain received by the Government through contractation in 1932. Such an increase in receipts in kind transforms the machine and tractor stations into highly important sources of State grain supply.

III

The sum of 21,900,000,000 rubles is being invested in socialized agriculture during the Second Five-Year Plan period, as against 10,800,000,000 rubles during the first quinquennium. Investments in agriculture financed by the State are increasing to 15,200,000,000 rubles as against 9,700,000,000 rubles during the First Five-Year Plan period. If investments in agricultural electrification and in primary processing factories under the People's Commissariats of Agriculture and of State Farms as well as industry's investments in State farms (Workers' Supply Departments) are included, the value of State-financed construction in agriculture rises to 16,900,000,000 rubles, while 5,000,000,000 rubles will be invested by the collective farms out of their own accumulations. Besides this the collective farmers are investing

6,500,000,000 rubles during the Second Five-Year Plan period in individual stock-raising, including the buildings necessary for this purpose, as well as in the construction of living quarters.

The following table clearly illustrates the improvement in the material and technical base of agriculture:

Indices	During First Five-Year Plan period	Specified for the Second Five-Year Plan period
Tractor shipments for agriculture (million h.p.) .	2.4	8.68
of which:		
Machine and tractor stations	1.2	6.60
State farms	1.2	2.08
Combine shipments (thousands, in 15-ft. equivalents)	15.5	86.6
of which:		
Machine and tractor stations	3.0	72.4
State farms	12.5	14.2
Motor vehicles shipped (thousands)	14.4	170.0
Capacity of electric stations and sub-stations commencing operation for agriculture (thousand kw.)	36.0	384.0
Construction of new machine and tractor stations (units)	2,446	3,554
Construction of new machine and tractor repair shops (units):		
P.C. of Agriculture	1,800	3,500
P.C. of State Farms	520	1,100
Numbers of livestock:[1] (millions):		
Cattle: State farms	3.2	6.2
Cattle: Collective stock farms	5.3	8.5
Hogs: State farms	1.8	5.5
Hogs: Collective stock farms	2.4	8.2
Sheep and goats: State farms	5.7	12.2
Sheep and goats: Collective stock farms	5.4	22.6
Increase in irrigated area (thousand ha.) . .	1,140	1,000

[1] As of end of year.

The program of construction provides for a 126 per cent [2] increase in the fixed capital of socialized agriculture by the end of 1937 which in consequence will considerably raise the level of technical equipment in agricultural production as may be seen from the following data (in 1926-27 prices): (See table top of p. 289.)

In 1932 the fixed capital invested in agriculture per hectare of sowing area amounted to 135 rubles; in 1937 this figure will rise to 217 rubles. In 1932 the value of implements in agricultural production was 32 rubles per hectare of sowing area, while in 1937

[2] Inclusive of the State farms under the People's Commissariat of Supply, the All-Union Co-operative Association, the Workers' Supply Departments and other organizations; also inclusive of the fixed capital in agricultural electrification and in factories for the primary processing of agricultural products.

Years	Fixed capital invested in agriculture (billion rubles)	Of which: value of implements (billion rubles)	Fixed capital invested per ha. of sowing area (rubles)	Value of implements per ha. of sowing area (rubles)
1932	18.1	4.2	135	32
1937	30.3	7.6	217	54
1937 in % of 1932	167.4	181.0	160.7	168.8

this figure will rise to 54 rubles, which compares with 23 dollars in the United States in 1930.

In view of the assigned task of completing the technical reconstruction of agriculture, it is planned to increase the proportion of funds to be expended for machinery and implements. Expenditures for these items will constitute 33.4 per cent of all capital investments of the State farms, collective farms and machine and tractor stations, as against 27.6 per cent during the First Five-Year Plan period.

Agricultural machinery, implements, and other dead stock to the value of 2,600,000,000 rubles are being supplied to agriculture during the years of the Second Five-Year Plan, which amounts to 163.0 per cent of the quantity received during the First Five-Year Plan period, while the share of machinery with mechanical traction will amount to 82 per cent.

Under the Second Five-Year Plan agriculture is receiving tractors of an aggregate capacity of 8,680,000 h.p., which is equal to 361.7 per cent of the capacity received during the First Five-Year Plan period. With the completion of the Chelyabinsk Plant and the reconstruction of the Stalingrad Plant, the number of caterpillar tractors supplied is sharply rising. Instead of the 5,000 caterpillar tractors supplied to agriculture during the course of the First Five-Year Plan period, more than 100,000 will be delivered during the years of the Second Five-Year Plan.

The extent to which agricultural production will be equipped with tractors and machines for the 1937 season appears from the following table:

Agricultural equipment	1932 (per 1,000 ha.)	1937 (per 1,000 ha.)	1937 in % of 1932
Tractors (15 h.p. equivalents)	1.1	4.2	381.8
Tractor-drawn ploughs (in single bottoms)	3.6	14.3	397.2
Tractor-drawn seeders	1.5	3.2	213.3
Combines	0.13	1.0	769.2
Large-size flax-pulling machines	—	5.0	—
Tractor-operated beet lifters	3.9	8.2	210.0
Corn pickers	0.46	3.3	717.3

This planned volume of machinery with which agriculture is being equipped during the Second Five-Year Plan period places the U.S.S.R. in a position which is not only higher than the degree of mechanization of the capitalist countries in Europe—an altitude which it had already achieved at the end of the First Five-Year Plan period—but is also above the degree of mechanization attained by the United States.

In field work as well as in harvesting, the proportion and aggregate total of mechanized operations in the U.S.S.R. are considerably in excess of the corresponding figures for the United States, not to mention Germany in which country, according to the data of the agricultural census of 1925, 60.2 per cent of the farms employ no agricultural machinery whatsoever.

In the course of the two Five-Year Plan periods Soviet agriculture, the technical level of which was exceptionally low at the beginning of the First Five-Year Plan period, has been improving to such an extent that it will attain first place in the world.

The high degree of mechanization to be achieved in agriculture in the U.S.S.R. will represent the combined result of a notable numerical increase in tractors and machines, and of the more efficient use made of this machinery than in the capitalist countries.

Indices	U.S.A. 1930	U.S.S.R. 1937	U.S.S.R. in % of U.S.A.
Tractor fleet (thousand h.p.) . . .	11,000	8.200	74.6
All tractor work in terms of ploughing (million ha.)	66	270	409.0
Total number of combines (thousands)	61	100	163.8
Harvesting by combines (million ha.).	14.1	29 5	209.2

Though possessing a smaller tractor fleet in 1937 than the United States did in 1930, U.S.S.R. tractors will till an area four times as great as that cultivated by the former. In 1937 the utilization of the Soviet tractor fleet will be five times as great as that of the United States in 1930.

The increase, in the volumes projected, of equipment for agricultural production ensures the completion in the main of the mechanization of the latter during the Second Five-Year Plan period. The universal character of the technical revolution and the depth to which it is penetrating agriculture become strikingly apparent on examining the following data (in percentage of total area):

Indices		1928	1937
Ploughing for spring crops with:	wooden ploughs	9.8	—
	horse-drawn ploughs	89.2	20
	tractor-drawn ploughs	1.0	80
Sowing of spring grain crops with:	hand labour	74.4	—
	horse-drawn seeders	25.4	45
	tractor-drawn seeders	0.2	55
Harvesting of grain crops with:	sickle or scythe	44.4	—
	horse-drawn implements	55.4	40
	tractor-drawn implements	0.2	60
	of which: combines	—	30
Threshing of grain crops with:	flails and other hand impl.	40.7	—
	machinery operated by horse power	58.0	15
	machinery operated by mechanical means	1.3	85

In addition to the mechanization of grain production, the mechanization of industrial and row crops such as flax, beets, cotton and corn will be carried out in the main. In effecting the mechanization of industrial crops, the U.S.S.R. introduces not only the present types of machinery but is creating entirely new types to meet the special conditions of large-scale socialist agriculture. The accelerated mechanization in the Soviet Union of the cultivation and harvesting of row and industrial crops—the low degree of mechanization of which under capitalism has revealed more strikingly than anything else the specific limitations of the latter in the development of the productive forces of agriculture—constitutes a special characteristic of the socialist solution of the problem of machine production in agriculture during the Second Five-Year Plan period.

The first steps towards mechanizing industrial and row crops were taken as early as the First Five-Year Plan period. The output of harvesting machinery for industrial crops then represented 4.1 per cent of the total value of agricultural machinery produced, as against 0.4 per cent in 1928. Under the Second Five-Year Plan the output of agricultural machinery for industrial crops is increasing 3-fold, while the proportion of agricultural machinery for industrial crops is rising to 13 per cent of the total output value. During the years of the First Five-Year Plan period 3 rubles per ha. were invested in harvesting machines for industrial and row crops; under the Second Five-Year Plan this sum is being increased to 15 rubles, or one and a half times the investment in harvesting machinery for grain crops per ha. (about 10 rubles during the Second

Five-Year Plan period). This quantitative increase in industrial crop machinery is sharply raising the percentage of machine cultivation of these crops.

In the Soviet Union 60 per cent of the corn acreage will be harvested by corn pickers while in the United States most of the corn is picked by hand.

In 1937, 50 per cent of the flax area will be harvested by large-size flax-pulling machines.

While in Germany beets are mainly picked by hand, in the U.S.S.R beet harvesting will be mechanized 80 per cent by 1937.

Soviet agriculture will receive about 5,000 potato diggers which will mechanize the harvesting of a considerable portion of the area under this crop.

The organization of the manufacture of a special row crop tractor is of great importance for the mechanized production of industrial crops. About 30,000 row crop tractors are being supplied to agriculture during the Five-Year Plan period. With these tractors it is possible to cultivate 60 per cent of the area under principal row crops.

It is planned to supplement the mechanization of production processes proper by the mechanization of transportation and the rapid development of road building. During the Second Five-Year Plan period the number of motor vehicles in agriculture is increasing from 14,400 in 1932 to 170,000 in 1937.

By reason of the growth of mechanized transportation and freight traffic in agriculture, the construction of 200,000 km. of improved roads on the State farms and machine and tractor stations has been included in the Plan.

For the better maintenance and utilization of the tractors and machines supplied to agriculture during the Five-Year Plan period, it has been planned to build garages and sheds measuring in the aggregate 15,000,000 cu. metres and 17,000,000 cu. metres respectively.

The tractors and motor vehicles supplied to agriculture by no means diminish the importance of the draft animals which will be used extensively for the lighter kinds of farm work, such as harrowing, sowing, cultivation, hay mowing and hauling. According to the Plan, 80 per cent of the harrowing and 45 per cent of the sowing are to be done by the use of draft animals. Accordingly the horse-drawn implements to be manufactured during the Second Five-Year Plan period represent a value of 350,000,000 to 400,000,000 rubles.

The great increase in the number of machines and tractors dur-

ing the Second Five-Year Plan period raises the importance of repair work on agricultural machines and implements. The number of repair shops tantamount to machine shops in the domain of agriculture is increasing from 2,320 to 6,920, while that of metal-cutting machines is rising to 18,000. The most important problem in organizing the repair of agricultural machinery consists in reducing complete overhauling to a minimum by attending in time to planned preventive, current and partial repairs. Everyone employed in the field of agriculture must understand that current and partial repairs, not complete overhauling, must provide the basis for the complete utilization of tractors.

The plan for the allocation of tractors according to districts during the Second Five-Year Plan period is solving the problem of equalizing the traction supply in the principal grain regions and of considerably developing the mechanization of agriculture in the central regions.

NUMBER OF TRACTORS ACCORDING TO DISTRICTS

(as of end of year)

Districts	In 1,000 h. p.		1937 in % of 1932
	1932	1937	
Central and Northern regions	191	1,840	963.4
Eastern regions	609	2,360	387.5
Southern regions	917.5	2,695	293.7
Siberia and Far Eastern Territory	291.0	820	279.4
Central Asia and the Transcaucasian S.F.S.R.	214	465	217.3

The tractors shipped to agriculture make it possible to overcome the disparity that arose historically under individual peasant farming in the geographic distribution of the country's traction resources among the individual districts.

CORRELATION BETWEEN TRACTION SUPPLY AND VOLUME OF WORK, BY DISTRICTS

(% of total volume of work and traction supply for the whole Soviet Union)

Districts	1928		1937	
	Spring work	Traction supply	Spring work	Traction supply
Central and Northern regions	19.5	24.6	25.2	26.4
Eastern region	23.0	23 3	25.5	22.3
Southern region	40.1	32.0	31.0	30.0
Siberia and Far Eastern Territory	12.6	14.1	10.7	11.5
Central Asia and Transcaucasian S.F.S.R.	4.8	6.0	7.6	9.8

All the data quoted above demonstrate the great part played by the Second Five-Year Plan period in the creation of a system of machines which are mechanizing the entire complex of the principal agricultural production processes and which, on the basis of the completion of collectivization and of the growth in the agricultural output of the State farms and the machine and tractor stations, are ensuring the transformation of agricultural labour into a variety of industrial labour.

The increasing importance of the State farms as models of socialist organization in agricultural production and of increased labour productivity renders it imperative to make further investments in State farm construction. The 7,181,000,000 rubles which are being invested during the Second Five-Year Plan period will more than double the fixed capital of the State farms in 1937 in comparison with 1932.

The capital investments in State farms contemplated for the Second Five-Year Plan period will in the main serve to establish a complex of means of production necessary for the completion of the mechanization of State farm production and to carry out construction for dwelling and production purposes. This refers primarily to stock-raising State farms where the construction program for the Second Five-Year Plan period consists essentially in providing watering facilities, completing the construction of dwellings and farm buildings and in solving the forage supply problem.

The State farms which were organized during the First Five-Year Plan period were equipped with the most advanced technique, and the bulk of the mechanized means of agricultural production in the U.S.S.R. was concentrated on these State farms. Under the Second Five-Year Plan they are being technically equipped to a still greater extent inasmuch as they are receiving a considerably greater number of tractors, machines and implements than during the years of the First Five-Year Plan.

Machines and implements	Received by State farms during First Five-Year Plan period	Delivered to State farms during Second Five-Year Plan period
Tractors (thousand h.p.)	1,240	2,080
Inclusive of caterpillar tractors (units) .	5,000	17,000
Combines (units, in 15-foot equivalents) .	12,500	14,200
Motor vehicles (units)	8,500	50,000

Despite the fact that the bulk of machinery goes to the machine and tractor stations, the increase in the number of machines and implements shipped to the State farms enables the latter to retain their higher level of technical equipment. On the State farms tractor traction will reach 131 h.p. per 1,000 ha. of sowing area, while in the machine and tractor stations it will be 53 h.p. On the State farms there will be 2.3 combines and in the machine and tractor stations—0.9 combines per 1,000 ha. under grain.

Completion of machine and tractor station construction and inclusion in their service of the entire area sown by collective farms represent the cardinal problem under the Second Five-Year Plan for agriculture. During the spring campaign of the first year of the Second Five-Year Plan period, the machine and tractor service already comprised 58 per cent of the entire sowing area of the collective farms, 56.8 per cent of the area sown to grain, 95.7 per cent of the area sown to cotton and 90.4 per cent of the area sown to sugar beet, *i.e.*, in a number of very important industrial crops the machine and tractor station service covered almost the entire collective farm production and more than half of the total collective farm area under grain.

It is planned to increase the number of machine and tractor stations from 2,446 to 6,000. Their average capacity is rising from 30 to 65-70 tractors (in 15-h.p. tractor equivalents). In 1937 the machine and tractor station service will encompass 110,000,000 to 115,000,000 ha. of collective farm sowing area as against 52,600,000 ha. in 1932

During the years of the Second Five-Year Plan the machine and tractor stations, which represent the industrial form of organization of collective farm production, are becoming the principal and deciding basis for the concentration of the means of collective farm production. In 1937 the machine and tractor stations will possess 53 per cent of the total value of the dead stock in agriculture as against 13 per cent in 1932.

The value of implements and traction facilities of the machine and tractor stations, which in 1932 was equal to 18 per cent of that of the collective farms, will constitute 135 per cent of the value of implements and traction facilities of all collective farms in 1937 (inclusive of horse traction).

By the end of 1937 the tractor fleet of the machine and tractor stations will comprise 6,200,000 h.p. as against 1,077,000 h.p. in 1932. In that year the power of the tractor fleet of the machine

and tractor stations was equivalent to 13 per cent of the horse traction power of all collective farms, while in 1937 the proportion will be 55.4 per cent, more than half of the horse traction capacity of the collective farms. In 1937 the combine fleet of the machine and tractor stations will comprise 75,000 combines as against 3,000 combines in 1932. By the end of 1937 the machine and tractor stations will control 75 per cent of the entire number of tractors in the country, 80 per cent of the tractor-drawn ploughs, 75 per cent of the seeders, 75 per cent of the combines and 80 per cent of the complex threshers.

In 1937 tractor ploughing on the collective farms must rise to 80 per cent as against 30 per cent in 1932. Harvesting with complex tractor-drawn implements covered about 6 per cent of the area under grain in 1932; in 1937 up to 60 per cent of this area will be harvested by combines or other tractor-drawn harvesting implements.

IV

The increased use of chemicals in agriculture represents an essential link in its technical reconstruction during the years of the Second Five-Year Plan period. Mineral fertilizers applied in combination with a complex of scientific agricultural measures, crop rotation and new machine technique constitute powerful means of securing high yields of industrial crops.

Agriculture is receiving considerable quantities of mineral fertilizers under the Second Five-Year Plan.

Mineral Fertilizer Shipments for Agriculture
(thousand tons)

Kinds of fertilizers	1932	1937
Nitrates	22.2	1,410
Potash	79.0	1,680
Superphosphates	614.0	3,000
Powdered phosphorites	396.0	2,200

The increased shipments of mineral fertilizers ensure considerably greater quantities of these fertilizers for the acreage under industrial crops. (See table top of p. 297.)

The supply of nitrate fertilizers to cotton plantations is increasing from 6 per cent of the sown area in 1932 to 80 per cent in 1937; of phosphates—from 6 per cent to 80 per cent; the supply of ni-

Crops	Percentage of acreage fertilized in 1937 with:		
	Nitrates	Phosphates	Potash
Cotton	80.0	80.0	20.9
Sugar beet	40.0	100.0	40.0
Long-fibre flax . .	27.5	73.4	60.0
Hemp	33.5	39.1	39.1

trate fertilizers to beet fields is increasing from 6 per cent to 40 per cent, of phosphates—from 9 per cent to 100 per cent.

In 1937 up to 4,000,000 ha. sown to grain or grass in regions within the former "consumers' belt" will be fertilized with powdered phosphorite.

It is planned to use powdered phosphorite fertilizer as one of the chief measures for raising yield in the consumers' belt, inasmuch as the results obtained with this fertilizer in these districts have been highly satisfactory, and its use is economically quite expedient since there are local phosphorite deposits and only small capital investments are required to build grinding mills.

The use of farmyard manure acquires great importance under the Second Five-Year Plan. Its quantity is increasing from 306,000,000 tons in 1932 to 439,000,000 tons in 1937 while the percentage of utilization is rising from 45 to 72. It is planned to apply farmyard manure to the following crops:

Crops	Percentage of total area	
	1932	1937
Acreage of winter crops	9.0	23.5
Potatoes and other root crops . . .	11.0	34.5
Hemp and vegetables	44.0	49.4
Total	11.6	26.0

While in the U.S.S.R. as a whole one-fourth of the entire winter crop is being supplied with farmyard manure, the supply of the latter in certain districts for winter crops is rising to two-thirds of the sowing area.

In order that the enormous quantity of fertilizers available may be properly applied, the Plan makes provision for the requisite transportation and storage facilities, for setting up standard types of mixed fertilizers for individual districts, for establishing an agrochemical service and the manufacture of special implements for the rational, mechanized application of fertilizers to the soil.

The combating of agricultural pests, the chemical cleaning of seeding material and numerous other practical applications of chemistry to agriculture must be extensively developed.

The Second Five-Year Plan maps out a great program for the irrigation and amelioration of new stretches of land. The volume of capital to be invested for these purposes is rising from 1,000,000,000 rubles during the First Five-Year Plan period to 1,800,000,000 rubles during the second.

In consequence the irrigated area is increasing by 1,000,000 ha., of which 383,000 ha. will be used for alfalfa in cotton crop rotations. Of the increase in irrigated area, 148,000 ha. are being allocated to rice growing, 52,400 ha. will be used as orchards or vineyards and 37,000 ha. have been reserved for southern fibre crops.

For the purpose of carrying out the preliminary work for the irrigation of the Trans-Volga Area and of testing the feasibility of scientific farming and the system of irrigated grain farming on an industrial scale (on State and collective farms), the Plan provides that 130,000 ha. under grain crops in the Trans-Volga Area be irrigated by locally draining the spring waters of the small Volga tributaries. This in conjunction with extended afforestation will be of decisive importance in converting the Trans-Volga region into a stable grain base of the Soviet Union.

Considerably improved exploitation of the irrigation systems, complete utilization of all irrigated areas, technical improvement of the irrigation systems, rational rates of watering and a determined struggle against silting by reconstructing the reservoirs and mechanizing the cleaning of the irrigation systems constitute the tasks to be accomplished by the irrigation construction plan.

Drying boggy and excessively humid lands is one of the most important amelioration measures. At the same time 5,000,000 ha. of virgin soil must be planted in the consumers' belt. The Plan includes extensive operations for drying the Colchis Valley in Transcaucasia as well as stretches of land in White Russia and the Far Eastern Territory which can be rendered available for agricultural production.

V

Mastery of the new technique and of scientific farming is the condition on which the completion of technical reconstruction in agriculture depends. The problem of husbanding the entire com-

plex of tractor-drawn machines and of raising labour productivity and the rate of output concomitantly with a decided qualitative improvement in tractor work is a most important factor in the completion in the main of the mechanization of agriculture.

The great increase in the number of tractors, automobiles, machines and implements in the machine and tractor stations squarely poses the problem of assimilating all this equipment during the Second Five-Year Plan period. The machine and tractor stations as well as the State farms must increase the utilization of the tractor fleet and the other powerful means of labour, setting themselves the task of shortening as much as possible the time limits fixed for the principal operations: soil preparation, attention to crop sowing, harvesting and threshing.

The formation of considerable cadres of skilled workers on the collective and State farms is a decisive factor in mastering socialist agriculture's powerful machinery base. It is planned to increase the number of tractor drivers 3-fold, of combine operators—6-fold and of chauffeurs—8-fold during the second quinquennial period. There is to be a simultaneous increase in the number of skilled repair shop workers: mechanics, turners, welders, etc. A total of 2,500,000 skilled workers will handle modern, perfected machines. The number of trained collective farmers working with tractor-drawn machines is increasing to a total of 5-6,000,000. There will be a great increase also in the army of skilled organizers and managers of socialist farming: brigade leaders, collective farm chairmen, State farm and machine and tractor station directors, agronomists, engineers, mechanics, farm chemists, bookkeepers, etc. The number of college-graduated specialists working in agriculture is increasing from 33,700 in 1932 to 102,700 in 1937, or 304.7 per cent of 1932.

The organizational and economic consolidation of the collective and State farms, the mastery of agriculture's powerful technical base and the formation of trained cadres conduce to a notable rise in the productivity of agricultural labour during the Second Five-Year Plan period. The gross output per worker must increase 87 per cent, while the fixed capital per worker is rising 55.5 per cent.

Mastery of machine technique in socialist farming ensures a considerable rise in the hourly rate of output to be achieved by more completely utilizing the wide reach of machine units and of tractor speed. Simultaneously the useful labour time per machine unit per day is to be decidedly lengthened by shortening

the time tractors and attached implements stand idle. This will result in a sharp increase in the use factor of machines and tractors.

Work Performed by Tractor-Drawn Machinery:
(1937 in % of 1933)

	Work performed per hour	per day
Ploughing	126	175
Sowing of spring crops	142	170
Combine harvesting	234	544
Threshing	150	171

Harvesting and threshing exhibit the greatest rates of increase in output per hour. Here the most important problem facing the State farms and machine and tractor stations is to master the technique of the combines and to utilize the complex threshers to the fullest extent.

Increased output in ploughing hinges in the main on a sharp reduction in idle time and the complete utilization of tractors during working hours.

Besides increasing output per tractor and machinery, increased labour productivity will account for a sharp reduction in the time limits fixed for the principal operations and will permit these limits to be brought into conformity with the requirements of scientific farming. Thus in 1937 all ploughing will be done in half the time it took in 1933, sowing will take one-third the number of days, harvesting less than half the number of days, while threshing will consume 75 per cent of the working days required in 1933.

The creation of a complex of machinery for all the chief categories of agricultural field work (ploughing, sowing, cultivation, harvesting of grain and industrial crops) necessitates a redistribution of tractor power. Whereas in 1933 the tractor was mainly employed in ploughing (which represented 73.1 per cent of all tractor work) and in threshing (15.9 per cent), in 1937 only 54.6 per cent of all work performed by tractors will be ploughing, and only 10.3 per cent threshing. There is a sharp increase in the percentage of tractor cultivation (3.4 per cent as against 0.7 per cent in 1932), grain harvesting (10.6 per cent as against 1.6 per cent in 1932) and industrial crop harvesting (11.4 per cent as against 3.5 per cent). Accordingly, in 1937 the volume of tractor-operated work will exhibit an increase of 5 per cent for plough-

ing, a 3-fold increase for sowing, a 7-fold increase for cultivation and a 12.6-fold increase for grain harvesting.

The mechanization of agricultural production makes it possible to solve already during the Second Five-Year Plan period the problem of a more equable distribution of agricultural work over the main seasonal working periods.

According to data of peasant budgets for 1922-24, the traction-power-hours and man-hours spent per hectare of spring grain were as follows:

Consumption per ha. of sowing area	Power-hours of traction	Man hours
Spring season	72	64
Harvesting season	17	136

In 1937 consumption for these operations will be considerably reduced as a result of the mechanization carried into effect during the Second Five-Year Plan period.

Consumption per ha. of sowing area	Power-hours of traction	Man hours
Spring season	36	19.5
Harvesting season	24	30.0

The amount of traction per hectare required for the spring operations in 1937 will be reduced to half in comparison with the amount required per hectare on individual farms in 1922-24. Traction for harvesting is increasing due to the complete elimination of manual harvesting and the complete change to the use of mechanical and horse power in harvesting.

At the end of the Five-Year Plan period the amount of labour power consumed per hectare of sowing area will be reduced to one-third during spring operations and to two-ninths during the harvesting period.

The considerable diminution in the traction and labour power required per hectare of sowing area and of harvesting is reducing the time limits set for carrying out the main agricultural operations.

Thus, under small-scale peasant production one hectare of sowing area required 7.2 days of traction and consumed 6.4 days of human labour power. Under large-scale, socialist, mechanized agriculture, with rational utilization of machine technique, with the combination of mechanical and horse power and with 50 per cent of the spring crop area ploughed in the autumn, the labour

consumed per hectare sown to spring crops is undergoing sharp reduction and all sowing will be carried out in considerably shorter periods of time.

VI

The period of reorganization in agriculture, which came to an end during the first quinquennium, was attended by the rapid breaking of new soil and the extension of the sown areas. The central task of the Second Five-Year Plan period consists in improving as much as possible the tilling of the land already under cultivation and in raising the yield. During the First Five-Year Plan period the increase in sown area amounted to 21,400,000 ha.; during the second period it is planned to extend the sowing area by the addition of 5,300,000 ha. The increase in the sowing area of the State farms will total 3,350,000 ha. By 1937 the sowing area of the collective farms and the collective farmers will have been enlarged by 1,950,000 ha., or 1.6 per cent, in comparison with the sowing area of the collective farms and the individual peasant farms in 1932.

Whereas during the years of the First Five-Year Plan period the increase in sowing area affected in the main the Southern and Eastern regions of the European part of the Soviet Union, under the Second Five-Year Plan the Northern and Central Districts and Siberia are scheduled to exhibit the principal additions to the sowing area.

Of the total increase in the sowing area, 67.8 per cent has been allotted to the consumers' belt where at the present time only 25 to 30 per cent of the arable land is ploughed while in the Ukraine the percentage of ploughed land is 90 to 92 per cent and in the Northern Caucasus—80 per cent. The breaking of 5,000,000 ha. of virgin soil in the consumers' belt and the carrying out of an entire system of agronomic measures based on modern technique serve as a guarantee that the task set by the Communist Party and the Government of transforming the consumers' belt into a producers' belt will be accomplished.

It is planned to augment the area sown to grain so that it will total 104,800,000 ha. as against 99,700,000 ha. in 1932. This extension of the grain area will be effected largely by increasing the wheat area (winter and spring) which is scheduled to rise from 34,500,000 ha. in 1932 to 40,800,000 ha., *i.e.*, by 18.4 per cent.

The entire increase in grain crops during the Five-Year Plan

period and part of the area at the present time under less valuable crops (millet) will be devoted to increasing the area sown to wheat.

The principal grain districts will supply the greatest increase in wheat area; there the area under wheat is increasing by 13 per cent.

Area Sown to Wheat (million ha.)

Regions	1932	1937	1937 in % of 1932
Ukraine	6.95	8.08	116.3
Urals	2.2	2.4	108.8
Bashkiria	0.9	1.1	119.0
Central Black Soil Region	1.0	1.3	123.6
Siberia and Far Eastern Territory	4.7	6.15	130.8

However, the deciding factor in securing a 50 per cent increase in the amount of grain harvested in comparison with the First Five-Year Plan period is not extension of sowing area, but increase in yield. Of the 349,000,000 centners representing the total increase in grain harvested, only 51,000,000 centners will be accounted for by a rise in sowing area; the remaining 85.4 per cent of the total increase in grain output must represent the result of the struggle waged by the State farms, the machine and tractor stations and the collective farms for a high and stable yield. The average grain yield throughout the Soviet Union is increasing from 7.5 centners in 1928-32 to 10.0 centners in 1937—a 33.3 per cent improvement. The task of increasing the yield in the chief grain districts is characterized by the following data:

Grain Yield (centners per hectare)

Regions	Average for 1928-32	1937
U.S.S.R.	7.5	10.0
Ukraine	8.8	11.6
Northern Caucasus	7.1	10.5
Lower Volga	5.3	7.7
Urals	6.9	9.0
Central Black Soil Region	8.5	11.0

The Second Five-Year Plan contemplates the establishment of all the conditions necessary to raise grain yield to the extent projected. The inclusion of all collective farms in the machine and tractor station service and the increase in the capacity of the tractor fleet and of the complex machines and implements to an extent which ensures 80 per cent mechanized ploughing furnish the basis on which the struggle for high and stable yield must be

waged. By the application of powerful machinery all districts must intensify the fight for the thorough weeding of the fields, for the shift to planting pure-bred seeds, for the most extensive autumn ploughing, for the provision of winter crops with bare fallow land, and for optimal time limits for sowing and prompt harvesting without losses.

The Plan makes provision for a definite complex of principal agronomic measures to raise the yield of grain crops.

Agronomic Measures for Raising the Yield of Grain Crops

Kinds of measures	1932	1937	Area embraced in 1937, in % of total sown area
	(in million ha.)		
Area sown to principal grain crops with pure-bred and high-grade seed	27.5	78.6	75.0
Bare fallow land	7.5	18.5	48.0
Improved preceding crops	10.0	52.4	50.0
Autumn ploughing for spring crops	24.2	40.0	60.0

The introduction of crop rotation on all collective and State farms and the inclusion of carefully cultivated row crops in crop rotations give rise to a sequence of crops favourable for grain farming and represent most important conditions for the establishment in all districts of high and stable yields and of a considable increase in grain growing in these districts.

The Second Five-Year Plan provides for the commencement of major operations to combat drought and transform the Trans-Volga Area into a stable grain base of the Soviet Union. Afforestation must be accompanied by the forced development of a system of irrigation on which the overcoming of drought primarily depends. Local ditches will provide irrigation for 130,000 ha. during the Second Five-Year Plan period.

The close interlinking of scientific farming with large-scale machine technique, the re-adaptation of farming methods and the structural adaptation and change in the type of agricultural machinery to suit the requirements of scientific farming make it possible to place Soviet agriculture on a strictly scientific basis where it can utilize international progress in the science of agriculture.

The State grain farms which under the First Five-Year Plan developed as the vanguard of large-scale socialist grain growing based on the application of modern machine technique to agri-

culture must occupy a prominent position during the years of the Second Five-Year Plan period in the struggle for high and stable yield. Complete provision for fallow land and autumn ploughing, careful tilling of the soil and extirpation of weeds, introduction of crop rotation on all State farms and mastery of machine technique and of large-scale scientific, socialist farming represent the main levers for raising crop yields throughout the entire State grain farm system.

In accordance with the task of raising yield and the more intensive cultivation of arable land, coupled with the increase in the total sowing area of the State grain farms, the Plan specifies that the area sown to winter crops be increased, as a result of which the crop structure on the State grain farms will be more favourable from the point of view of scientific farming and of the more even distribution of labour and traction consumption.

The Plan provides among other agronomic measures calculated to raise crop yield that the area under winter crops be fully provided with bare fallow land and that by far the greater portion of the area under spring crops be ploughed in autumn.

The splitting up of cumbersome State farms, the geographic redistribution of areas under grain in favour of regions of high crop yield, and the introduction of stock-raising as an auxiliary branch on the State grain farms, so as to utilize the waste products of grain production and provide farmyard manure, will raise the grain yield on the State grain farms no less than 60 per cent in comparison with the yield for 1930 to 1932. The wheat output of the State grain farms is rising from 10,200,000 centners to 29,300,000 centners.

Under the First Five-Year Plan the State stock farms became huge producers of grain in addition to providing meat, milk and wool. The more correct geographic distribution of all specialized State farms so as to permit of the maximum utilization of the natural resources, and the overcoming of the drawbacks associated with their one-sided specialization create all the prerequisites necessary for the further increase in grain production (principally forage crops) throughout the entire system of State farms under the People's Commissariat of State Farms. With the total area under crops on the State farms of the People's Commissariat of State Farms rising from 7,300,000 ha. in 1932 to 9,800,000 ha. in 1937, the area sown to grain crops is being enlarged from 6,100,000 ha. to 7,600,000 ha. The area sown to

wheat is undergoing an increase of from 3,500,000 ha. to 3,800,000 ha. Grain crop yield on the State farms under the People's Commissariat of State Farms is rising to an average of 10 centners per hectare while the gross amount harvested in increasing to 76,000,000 centners.

It is one of the most important tasks under the Second Five-Year Plan to effect a considerable extension of the area sown to wheat in the districts of the so-called consumers' belt, and on this basis to transform the entire consumers' belt into a producers' belt.

In the consumers' belt farming was noted in the past for the exceptionally split-up character of the land holdings, the low technical equipment on the peasant farms and the prevalence of the three-field system. On the individual farms of the consumers' belt the average area sown was 3.7 ha. per household, while in the producers' belt the average sowing area was 5-6 ha. In the consumers' districts the equipment per peasant farm did not exceed 130 rubles in value, while in the producers' districts the corresponding figure was 200 to 250 rubles. In 1925 the wooden plough still held sway in the consumers' belt, being used on 25 to 40 per cent of the total area tilled.

The prevalence of hand sowing, and of the scythe and sickle in harvesting completed the picture of utter backwardness in agricultural technique.

The First Five-Year Plan period wrought a decisive change in the agriculture of the consumers' districts. In 1933 as many as 18,700,000 ha. of sowing area (66 per cent) were concentrated under the control of somewhat more than 108,000 collective farms. The wooden plough has been forced out of use, hand sowing has made room for seeders and in most of the districts grain crops are harvested by machines. The tractor fleet of the consumers' districts has increased to 167,000 h.p., which is adequate for ploughing 2,000,000 ha.

The technical re-equipment of agriculture in these regions under the First Five-Year Plan was accompanied by great progress in the application of scientific farming. The three-field system has given way to multiple field crop rotation which is already in use on more than half of the total sowing area. During the years of the First Five-Year Plan period the sowing area in the consumers' belt increased by 4,500,000 ha., which amounted to

21 per cent of the total increase in sowing area for the entire Soviet Union, whereas during the preceding years the sowing area in these districts had remained stable and in some districts had even receded. Rational utilization of the area under plough and the addition of virgin soil to the cultivated area in the old settled districts make it possible for socialist economy to extend the sowing area still further in the future.

During the years of the Second Five-Year Plan period the machine and tractor stations and State farms of the consumers' belt are being stocked with additional tractors representing a total of 1,840,000 h.p., inclusive of powerful caterpillar tractors representing 900,000 h.p., and the necessary sets of machines for stumping and amelioration work. This ensures the breaking of 5,000,000 ha. of virgin soil and an increase in the sowing area of the consumers' belt by 3,600,000 ha., of the area sown to grain—by 2,400,000 ha. and to wheat—over 3,000,000 ha.

The advisability of augmenting wheat production in the northern section outside of the Black Soil Belt has been confirmed by the experience with wheat sowing in these districts. Thus, while the average winter wheat yield throughout the U.S.S.R. in 1928-32 was 8.6 centners, the wheat yield in the consumers' belt was 9.6 centners and the rye yield—9.2 centners.

The increase in grain growing in the consumers' belt requires a radical change in the farming methods applied to these districts. The adoption of the multiple field system by all collective farms, the setting aside of bare fallow land for winter wheat, the autumn ploughing in due time for spring crops, the increase in the degree of manuring of the sector sown to winter crops and the change to pure-bred seeds render it possible to raise the grain yield in these districts to 10.5 centners per ha.

The considerable increase in grain sowing and in yield are raising the grain output of the consumers' belt from 154,800,000 centners in 1932 to 243,900,000 centners in 1937, and the wheat output—from 3,200,000 centners to 39,100,000 centners for the respective years.

With the total population of the consumers' belt increasing 6 per cent and of its urban population—17 per cent, the increased grain production will make it possible to double the locally grown wheat consumption in these districts and sharply to cut grain shipments from other districts.

Gross Production and Distribution of Grain in the Consumers' Belt
(million centners)

Indices	1928			1937		
	All grains	Of which:		All grains	Of which:	
		Wheat	Rye		Wheat	Rye
Gross total of harvest	154.8	3.2	87.3	243.9	39.1	97.7
Rural consumption (personal and productive)	168.8	9.6	93.3	212.9	31.1	85.7
Rural grain balance . .	—14.0	—6.4	—6.0	+31.0	+8.0	+12.0
Urban consumption . . .	26.1	9.2	8.3	47.0	31.2	12.0
Grain balance of the belt as a whole	—40.1	—15.6	—14.3	—16.0	—23.2	—

All the grain requirements for the rural population and for stock-raising in the zone outside the Black Soil Belt will be met by supplies grown in these regions. Urban requirements which are almost doubling since 1928 will be covered to the extent of 60 per cent by locally grown grain of these regions, while in 1928 all the grain required for the urban population and even 8 per cent of the requirements for the rural population were met by shipping grain from other districts.

The establishment of a new wheat base in the central regions of the Soviet Union increases the share of grain, particularly wheat, grown in these regions in comparison with the total grain produced. This is of the utmost importance for the promotion of stable grain production in the U.S.S.R.

Sowing Area of Grouped Districts in Percentage of Total

Districts	All Grains		Wheat	
	1932	1937	1932	1937
Northern and central districts . .	20.8	22.1	2.2	9.6
Eastern districts	29.5	27.4	36.4	32.2
Southern districts	36.2	35.9	39.1	36.0
Siberia and Far Eastern Territory .	8.7	10.1	13.6	15.0
Central Asia and Transcaucasian S.F.S.R.	4.7	4.4	8.6	7.1

The establishment of wheat production in the consumers' belt on so vast a scale necessitates the radical reconstruction of the whole of agriculture in these districts. The transition to a higher level of farming methods which is indispensable for wheat growing ensures the increased application of scientific farming in the growing of other crops also, particularly industrial crops. The considerable increase in grass growing, a necessary component part of crop rotation, the radical improvement of meadows and

pastures which must compensate for the diminution in natural pasture lands being ploughed under as well as the increase in grain production are setting up a firm forage base for the rapidly developing stock-raising of these regions.

Special mention must be made of the projected expansion of grain production in East Siberia and the Far Eastern Territory by increasing the area under grain, particularly under wheat, and by raising yield to a considerable extent. This augmented grain output, especially of wheat, in the Far Eastern Territory and in East Siberia will supply these regions with a firm food supply base of their own.

In the course of the Second Five-Year Plan period, Siberia and the Far Eastern Territory must adopt rationally organized agricultural production on the basis of proper crop rotation and a decided improvement in the quality of tilling and harvesting which is to be coupled under the Second Five-Year Plan with an augmentation of the tractor fleet (279 per cent) and a shift to types of machines best suited for the specific climatic and soil conditions of these regions.

VII

The Second Five-Year Plan maps out a further considerable increase in the output of industrial crops which greatly extends the raw material base of light industry and of the food industry. The total production of industrial crops must increase from 1,000,000,000 rubles' worth in 1932 to 2,380,000,000 rubles' worth in 1937.

At the same time the gross weight of fibre crops exhibits the following increase:

Gross Production of Fibre Crops
(thousand tons)

Crops	1932	1937	1937 in % of 1932
Cotton	1,270	2,125	167.3
Flax fibre	500	800	160.0
Hemp	262	476	181.6

Gross cotton production is increasing 67.3 per cent, thus ensuring the textile industry a supply of 700,000 tons of fibre. There is a rise of 60 per cent in the flax harvest. State flax procurements are increasing from 290,000 tons in 1932 to 520,000 tons in 1936-37, which ensures a 4-fold increase in the supply of raw material for the linen industry.

The amount of hemp harvested is increasing 81.6 per cent, while the commodity hemp procured by the State is multiplying 5 times—from 40,000 tons in 1932 to 200,000 tons in 1936-37.

The Plan specifies that the gross cotton harvest is to be increased solely by raising the yield. It is planned to raise the cotton yield in the irrigated districts to 12 centners per hectare as against 7.5 centners for the period of 1928-32, or an increase of 60 per cent. In the unirrigated districts the amount of cotton picked per hectare is to rise from 2.1 centners in 1932 to 3 centners in 1937, an increase of 43 per cent.

Whereas in the course of the First Five-Year Plan period the bulk of the newly cultivated irrigated area was sown to cotton, under the Second Five-Year Plan most of the increase in irrigated area will be used for cultures in cotton crop rotations, principally for planting alfalfa. This considerably increases the proportion of alfalfa acreage, thereby establishing more favourable conditions for increasing the cotton yield.

Classified Crops (percentage of total, inclusive of unwatered area)

Republics	Crops	1932	1937
Uzbekistan	Cotton	38.6	32.7
	Alfalfa	7.4	12.4
	Garden vegetables	1.5	2.2
Turkmenistan	Cotton	41.9	33.3
	Alfalfa	5.2	15.7
	Garden vegetables	2.4	3.3
Tajikistan	Cotton	15.4	16.5
	Alfalfa	2.6	8.7
	Garden vegetables	0.6	2.0

The area sown to alfalfa in the irrigated districts is rising from 317,000 hectares in 1932 to 700,000 hectares in 1937, causing the share of alfalfa in the total area under cotton and alfalfa to rise from 15.8 per cent to 29.5 per cent. It is thus assured that on the average 12.0 per cent of cotton planting in the cotton districts will be done on alfalfa ground, as against 2.4 per cent in 1933.

The cotton area fertilized with nitrates is being considerably extended. In 1937 nitrate fertilizers will be applied on 1,341,000 hectares or on 80 per cent of the planted cotton area as against 6 per cent in 1932. Due to the circumstances that local fertilizers (farmyard manure, slime from irrigation ditches, etc.), are being utilized to a maximum to supplement the nitrogen fertilizers, and that parallel with this a considerable increase in the area under

cotton on alfalfa ground is being effected, all cotton sown can be assured the best preceding crops and be supplied with fertilizers.

The completion of the following major irrigational construction projects already begun has been included in the Second Five-Year Plan: in Central Asia—the Vakhsh, Gimbai, Bairam Ali, the Malek branch and other projects; in Transcaucasia—the Orjonikidze Canal, the Karachala, Kiry, Sardarabad, Shiraki Canal and other projects.

The Plan further contemplates the construction and reconstruction, respectively, of the following huge irrigation systems: Ferghana Valley, Shakhrud, Southern Khorezm, Murgab and the Famine Steppe in Central Asia, and Mugan, Samgori and Terter in Transcaucasia.

In addition to completing irrigational construction already commenced, to developing new construction and cultivating the newly irrigated areas, it is planned to complete the reconstruction of the field ditch systems to meet the requirements of large-scale, mechanized cotton production of State farms and machine and tractor stations.

The Plan makes provision for a notable improvement in the quality of cotton. The area sown to Egyptian cotton is increasing from 51,000 hectares in 1932 to 230,000 hectares in 1937. It is planned to replace low-grade seeds by selected seeds on a vast scale which will secure greater fibre length and crop yields. The proportion of staple 26 mm. in length or less is to be reduced from 25.2 per cent in 1932 to 16.9 per cent in 1937 while at the same time the percentage of staple 28 mm. in length and over is to rise from 32.1 per cent to 55.7 per cent. The Plan provides for an appreciable increase in the mechanization of cotton growing, especially in the cultivation and harvesting of this staple. To this end the production of 30,000 row crop tractors during the Second Five-Year Plan period is being inaugurated at the Red Putilov Plant. There is a considerable increase in the output of tractor-drawn machines and implements specially adapted for cotton plantations. In 1937 the equipment of the State farms and machine and tractor stations will include the following machinery:

Machinery	State farms		Machine and tractor stations	
	1932	1937	1932	1937
Tractor-drawn cotton seeders . .	2,900	3,750	—	5,400
Tractor-drawn suspended cultivators	500	1,150	540	15,200
Tractor-drawn harvesters	1,110	2,080	2,100	23,500

The receipt of so great a number of machines by State cotton farms and the machine and tractor stations ensures the completion of the mechanization of the principal processes of cotton growing during the Second Five-Year Plan period.

Percentage of Mechanization of Cotton Production

Indices	State farms		Machine and tractor stations	
	1932	1937	1932	1937
Ploughing	100	100	38	70
Sowing	80	100	16	50
Cultivation	15	95	1	50
Harvesting	2	90	0.5	45

Under the Second Five-Year Plan the importance of the new cotton-growing districts is increasing because of the increase in yield from 2.1 centners to 3.0 centners, and the cotton harvested in the new regions is increasing from 68,300 tons of unginned cotton in 1932 to 109,000 tons in 1937. The possibility of completely mechanizing cotton growing in the new districts in conjunction with the comparative ease with which cotton growing is adapted to the conditions of unirrigated areas leads to a further growth of the new cotton base in the Soviet Union.

The inclusion of all cotton-growing collective farms in the machine and tractor station service and the organizational and economic consolidation of the collective farms raise the share of cotton produced by the collective farms from 86 per cent in 1932 to 94 per cent in 1937. The remainder—6 per cent of the crop as against 3.5 per cent in 1932—will be supplied by the cotton-growing State farms.

While keeping the area under cotton stable, the cotton-growing State farms are to raise their yield in 1937 to 12.6 centners for American cotton and to 7.0 centners for Egyptian cotton. As they have at their disposal a powerful tractor fleet and modern implements which ensure the complete mechanization of the main cotton-growing processes, the State farms must head the struggle for the mastery of the new technique of large-scale, socialist cotton growing under the Second Five-Year Plan.

The increase in the gross output of flax is to be achieved exclusively by raising the yield. According to the Plan flax yield is to rise from 2.26 centners per hectare (1928-32) to 3.7 centners per hectare. At the same time it is planned to effect a notable improvement in the quality of flax, raising the average fibre num-

ber from 7.9 to 14. The achievement of this projected figure brings about a 298 per cent increase in the commodity production of flax in terms of ton-numbers.

Flax yield must be raised and its quality improved by the introduction of crop rotation, by sowing 65 per cent of flax on clover land and on virgin soil, by ploughing the whole area sown to flax in the fall, by increasing the percentage of high-grade selected seeds from 1 per cent in 1932 to 75 per cent and by fertilizing 73 per cent of the sowing area with soluble phosphates. In addition, it is planned to use powdered phosphorite fertilizer for the entire area sown to clover as a preceding crop for flax.

Percentage of Total Area Embraced by Measures to Raise the Yield of Long Fibre Flax

	1932	1937
Area sown with pure-bred seeds	1	75
Autumn ploughing	20	100
Flax sown on clover land or on virgin soil	20	65
Mineral fertilizers (phosphates)	—	73
Mechanization of harvesting	20	60

The properly timed sowing, weeding and harvesting of flax are prerequisites which must supplement the complex of agronomic measures adopted so as to raise the flax yield to the planned level.

The process of mechanizing flax cultivation is in the main being completed during the Second Five-Year Plan period. During the first quinquennial period a factory base for the primary processing of flax was established and the first lot of harvesters shipped. The introduction of large-scale flax pullers under the Second Five-Year Plan makes it possible to mechanize 60 per cent of harvesting while the mechanization of primary processing will reach 60 per cent of the total gross output and 75 per cent of the commodity flax produced.

The Five-Year Plan likewise provides for a considerable increase in raw hemp which is also to be achieved in the main by raising the yield—from 2.8 centners per hectare in 1932 to 5.8 centners in 1937. The gross production of hemp exhibits a growth of from 262,000 tons in 1932 to 476,000 tons in 1937, while the commodity hemp procured is increasing from 40,000 tons in 1932 to 200,000 tons in 1936-37.

The hemp yield is to be raised by enriching the soil with farmyard manure and mineral fertilizers, by making maximum

use of the old hemp fields, by extending the hemp sowing in alluvial fields, by establishing sectors of land well provided with farmyard manure and other fertilizers for hemp growing, by replacing low-grade hemp seeds with southern seeds (Italian and North Caucasian) and the best long-fibre hemp seeds of Central Russia. The area sown with these seeds must be raised to 620,000 hectares in 1937. It is also planned to mechanize the harvesting and primary processing of hemp to a considerable extent (up to 40 per cent of the gross harvest) which in conjunction with the application of all the measures required by scientific farming must ensure a hemp crop of the dimension specified by the Plan.

In order to supply the maximum amount of fats required by the population and meet the increasing demand of industry for vegetable oil used for technical purposes, the Second Five-Year Plan makes special provision for increasing the oil-bearing crops so as to reinforce the raw material base of the vegetable oil industry.

It is planned to raise the value of the vegetable oil crops including volatile oil crops from 341,000,000 rubles in 1932 to 654,000,000 rubles in 1937, or a 91.7 per cent increase.

In addition to greatly increasing the production of sunflower seed (by raising the yield from 5.5 centners during the period of 1928-32 to 8.5 centners in 1937), it is planned to raise the value of new vegetable oil crops from 38,900,000 rubles in 1932 to 132,100,000 rubles in 1937, *i.e.*, more than a 3-fold increase.

First in importance among raw material crops for the food industry is sugar beet, the gross production of which it is planned to increase from 65,600,000 centners in 1932 to 276,000,000 centners in 1937. The more than 4-fold increase in the gross amount of sugar beets harvested must in the main be achieved by raising the yield 66 per cent in comparison with the average yield taken over a number of years. The important task of raising the sugar-beet crop makes it necessary to take steps to shift all beet-growing State and collective farms to rational crop rotation, to carry out deep autumn ploughing on the entire area under sugar beet, to fertilize the entire sown area with soluble phosphates and up to half the area with nitrate and potash fertilizers, and to augment the tractor fleet of the machine and tractor stations serving beet growing districts.

It is planned to increase the sugar-beet area from 1,098,000

hectares in 1932 to 1,450,000 hectares in 1937, inclusive of up to 1,380,000 hectares for the sugar refineries. The sugar beet area will be increased principally by forming a new sugar-beet base in the East, in Siberia, in the Volga District, in Kazakstan and in Kirghizia where the area of beets for sugar refineries is increasing as follows:

Area Sown to Sugar Beet in New Districts
(thousand hectares)

	1932	1937		1932	1937
West Siberia	12.0	35.0	Kirghizia	7.5	17.0
Kazakstan	2.2	17.0	Middle Volga	2.0	8.0
Transcaucasian S.F.S.R.	4.2	9.0	Saratov Territory	0.9	13.0
Far Eastern Territory	2.5	8.0	Bashkiria	0.8	4.0

In view of the increase in the area under sugar beet in the new agricultural districts from 32,100 hectares in 1932 to 113,000 hectares in 1937 and the formation of a new sugar-beet base in the East and in the new districts, the proportionate amount of sugar beet supplied by these districts is rising from 2.2 per cent in 1932 to 8.2 per cent in 1937.

The Plan provides for a radical reconstruction of the sub-tropical districts in the U.S.S.R.

For these districts, particularly well situated in respect to soil and climatic conditions, the task of "replacing the less advantageous crops by more advantageous crops" stands out in bold relief, in accordance with the decision of the Communist Party reached at its Sixteenth Congress.

Tea is the most important crop grown in the sub-tropical districts. The area under this crop is increasing from 31,800 hectares in 1932 to 45,000 hectares in 1937, besides 3,000 hectares in Colchis, while the tea-leaf harvest is increasing from 2,300 tons in 1932 to 48,600 tons in 1937.

Citrous crops (tangerines, lemons, etc.) are next in importance. The area planted to these crops will be multiplied 4 times in 1937 in comparison with 1932. The volatile oil raw-material base in the sub-tropical districts will grow to 5,000 hectares by the end of 1937 as against 2,400 hectares in 1932, while the geranium oil produced will be equal to 50 per cent of the world output.

An important place has been assigned by the Second Five-Year Plan to the cultivation of the tung tree which is of great national economic importance. Tung tree plantations are increasing in area from 300 hectares in 1932 to 10,000 hectares.

The area sown to ramie, a highly valuable textile crop, is being enlarged from 770 hectares (newly planted) in 1932 to 5,000 hectares in 1937.

The Plan provides for a considerable reconstruction of sub-tropical horticulture and forestry—an extension of the planting of cork oak, bamboo, eucalyptus, olive tree, camphor laurel tree and other varieties of trees, particularly those of rapid growth.

Among the sub-tropical rubber-bearing plants the guayule and the gutta-percha tree (eucommia) are being developed on an industrial scale. In addition to developing caoutchouc plantations in the sub-tropical districts, the Plan provides for a considerable development of rubber-bearing plants in other southern districts of the Soviet Union which greatly increases the raw material base of the rubber industry.

The Plan provides that simultaneously with the introduction of specialized machines and tractors which aid in the mechanization of the planting and harvesting of the highly valuable crops of these districts, measures be taken to drain the richest areas (Colchis) in the sub-tropical districts of the U.S.S.R.

At the same time it is planned to improve the condition of the areas already under cultivation and introduce modern scientific cultivation methods required by highly valuable crops on these lands. During the Second Five-Year Plan period all conditions are being created for the transformation of the sub-tropical districts of the Soviet Union—the most favourably situated regions in point of climate and soil fertility—into the gem of Soviet agriculture: these districts must meet the Soviet Union's requirements of the above highly valuable industrial crops on the basis of domestic production.

The Second Five-Year Plan provides for a considerable increase in the output of fruits and berries and for enlarging the area of orchards, vineyards and berry fields.

In 1932 the orchard area was 1,060,000 hectares, that of vineyards—270,000 hectares, and of berry fields—60,000 hectares. By 1937 the area occupied by perennial plants must be enlarged to reach the following totals: orchards—1,500,000 hectares, vineyards—380,000 hectares and berry fields—150,000 hectares. The value of the gross production of the orchards, vineyards and berry fields is increasing from 386,000,000 rubles to 753,000,000 rubles (in fixed 1926-27 prices). The considerable extension of orchards

and vineyards under the Second Five-Year Plan will result in a more favourable proportion of the fruit tree varieties planted, giving preference to early maturity and quality of product.

The collective farms will occupy first place in the increase in area planted to fruit trees, berry fields and vineyards during the years of the Second Five-Year Plan period.

The increased material well-being of the collective farmers and the rise in the productivity of collective farm labour, the increased means available to combat pests and to mechanize a number of processes involved in attending to orchards create favourable conditions for the extensive development of horticulture and for increasing the yield of fruit trees and berry plants.

VIII

The radical social and technical reconstruction of agriculture, the successful solution of the grain problem and the growth of socialist forms of stock-raising (State and collective stock farms) have created all the necessary prerequisites for a powerful upgrade movement during the Second Five-Year Plan period in stock-raising which suffered severe losses during the years of agricultural reorganization.

The central task in the field of stock-raising consists in the extended reproduction of productive and draft farm animals in all sectors at rates that will make it possible to solve the stock-raising problem in the main during the Second Five-Year Plan period on the basis of enlarging and consolidating the collective stock farms and State stock farms and of providing all collective farmers with cows and small livestock.

During the Second Five-Year Plan period the problem of the qualitative improvement of livestock must be squarely put and solved as well as the problem of decidedly raising its productivity by means of cross-breeding, proper care, maintenance and better feeding.

The increase in the livestock, as outlined by the Five-Year Plan, the sharp improvement in the quality of the herds and in the care they receive will mean a 2.25-fold increase in the gross output of livestock products in 1937 in comparison with 1932.

The Plan provides for the following numerical increases in the various kinds of livestock:

Kinds of livestock	Numbers of livestock, as of spring of the year indicated (millions)		
	1932	1937	1937 in % of 1932
Horses	19.6	21.8	111.2
Cattle	40.7	65.5	160.9
of which:			
Cows	21.0	26.9	128.1
Hogs	11.6	43.4	374.1
Sheep and goats	52.1	96.0	184.3
Poultry [1]	120.0	300.0	250.0
Rabbit does [1]	5.3	17.0	320.8

[1] Poultry and rabbit does—as of end of year.

The more rapid increases of hogs, poultry and rabbits in comparison with other kinds of livestock shifts the centre of gravity in the country's meat supply to the raising of rapidly maturing kinds of stock.

This permits dams of cattle to be kept from slaughter as long as possible so as to promote reproduction and raise the output of dairy products. It will also make it possible to slaughter steers at a later age which will increase the output of beef and of heavy hides for the leather industry.

The relative increase of rapidly maturing livestock likewise reduces the number of sheep to be slaughtered for meat and will thus raise wool production.

The development of early-maturing livestock gives rise to a decided change in the structure of the country's meat balance.

CLASSIFIED MEATS PRODUCED
(exclusive of offal, in % of total)

Years	Beef and veal	Mutton	Pork	Poultry and rabbits	Total
1932	46.8	18.1	27.7	7.4	100
1937	27.3	7.1	50.6	15.0	100

In addition to the quantitative increase of livestock the Plan contemplates a considerable improvement in its qualitative indices.

The average weight on hoof of livestock must rise 35.5 per cent for cattle, 24.6 per cent for hogs and 18 per cent for sheep.

Wool shearing per head of cattle is increasing 24 per cent, the average milk yield of cows—38 per cent.

As a result of the planned numerical increase in livestock and the improvement in its qualitative indices, the gross output of livestock products will exhibit the following growth:

LIVESTOCK PRODUCTS

Years	Meat (exclusive of offal, thousand centners)			Milk (million centners)	Wool (thousand centners)
	Total	Of which pork	Poultry and rabbits		
1932	22,940	6,350	1,700	202.3	691.0
1937	50,886	25,193	7,644	324.3	1,600.0
1937 in % of 1932 . .	221.8	396.7	449.6	160.3	231.5

Such rapid rates of numerical increase and qualitative improvement in the livestock herd become possible only because of the socialist reconstruction of agriculture, the organization of an extensive network of collective and State stock farms. The State stock farms which even at the present time possess more livestock of every kind except hogs than so well developed a cattle-raising country as Denmark are a major factor in improving this branch of agriculture. During the Second Five-Year Plan period the principal task of the State farms consists in fighting for quality, improving the breed of the stock and raising its productivity. The revolutionizing significance of the State farms increases in proportion as they become organizationally consolidated, eliminate the shortcomings in their work mentioned at the Seventeenth Congress of the Communist Party, master the technique of large-scale stock-raising and become transformed into model ranches of improved and pedigreed stock. Under the Second Five-Year Plan the numerical increase in productive stock on the State farms is planned as follows:

LIVESTOCK ON STATE FARMS
(millions, as of spring of year indicated)

Indices	1932	1937[1]	1937 in % of 1932
Cattle	3.5	6.7	191.4
of which:			
Cows	1.7	2.5	147.0
Hogs	1.9	6.4	336.8
Sheep and goats	7.2	14.9	207.0

[1] These data are subject to correction because part of the stock is being transferred to the collective stock farms.

In contradistinction to the First Five-Year Plan period when the State farm herds were formed in the main by means of purchase, during the Second Five-Year Plan period the improvement and further increase in the stock on the State farms will be effected exclusively by reproduction within their own herds. Besides, the State farm must likewise become a very important source for rendering State aid to the collective farms so as to develop the collective stock farms by selling them each year a number of grown and young cattle.

The resolute struggle being waged to combat death losses, to preserve young stock and diminish barrenness, to apply scientific stock-raising measures to the care, feeding and maintenance of livestock and the decided improvement in the herds achieved by crossing with the best foreign and native breeds ensure the planned increase of the stock and an improvement in all its qualitative indices: weight on hoof, wool and milk yield.

Indices of Productivity of Stock on State Stock Farms

Indices	1932	1937	1937 in % of 1932
Average weight on hoof of hogs on State hog farms (kg.)	65.1	106.5	163.6
Average weight on hoof of livestock on State beef-cattle farms (centners)	2.2	3.0	136.4
Average milk yield per cow on State dairy farms (litres)	827.0	1,700.0	205.6

It is planned to effect a structural change in the quota of cattle designated for slaughter on the State beef-cattle farms, primarily by raising the slaughtering age of steers to 2 years while at present a considerable number of them are marked for slaughter when 8 to 12 months old. In the quota of livestock marked for slaughter on the State beef-cattle farms the number of cross-bred steers slaughtered when 2 years old is increasing from 25.0 per cent in 1933 to 39.0 per cent at the end of 1937. The weight on hoof of hogs shows a sharp increase to be achieved by complete cross-breeding and improved organization of hog fattening.

The meat and fat production on the State farms is multiplying almost 4 times, the 1937 output constituting 373.7 per cent of the 1932 output; milk production is rising to 278.5 per cent of 1932 and wool production is more than doubling (255.7 per cent of 1932).

The fulfilment of the tasks placed before the State farms demands a decided improvement in the organization of labour, particularly the introduction of piece work combined with a system of prizes, including prizes awarded in kind (young stock) to workers for overfulfilling their planned assignments of work.

During the Second Five-Year Plan period the State stock farms are confronted with the task of creating their own stable forage base which will fully satisfy the succulent and coarse forage requirements of every State farm and up to 65 to 70 per cent of the concentrated forage requirements.

It is planned that the State pure-bred stock farms and the industrial State farms located at a great distance from railroads produce their own grain forage in sufficient quantities to meet their requirements in full.

In forming stable forage bases on the State farms, special stress must be laid on raising the yield to a considerable extent. In this connection great importance for the State stock farms attaches to the struggle for the scientific cultivation of the fields—transition to proper crop rotation, introduction of grass sowing, sharp increase in the sowing of root crops and leguminous plants, modern methods of field cultivation, 100 per cent utilization of farmyard manure and the introduction of green fallow as the most important measure to be applied in combating weeds.

The increase in the yield of sown grasses must be particularly great: on the State hog farms—from 17.4 centners to 26 centners per hectare and on the State beef-cattle farms—from 14.1 centners to 22 centners per hectare.

In addition to improving feeding and maintenance, the plan for the socialist reconstruction of stock-raising must pay a great deal of attention to measures calculated to improve the cattle breed on the State farms. The Five-Year Plan provides that the breeding of pure stock on the State farms be considerably enhanced in importance.

The State pure-bred stock farms must be economically reinforced and provided with cadres of skilled workers. The network of these farms must be extended and territorially distributed to accord with local and improved cattle breeds. The selection and breeding of pure-bred stock on the pedigreed stock farms must be supplemented by the formation of groups of the most valuable cross-bred and local stock on all the other State farms so that they may be extensively used to improve the quality of the herd.

The improvement of stock-raising on the collective stock farms and of the cattle in the private possession of the collective farmers by supplying the collective stock farms with high-quality pure-bred stock represents one of the chief tasks of the State pedigreed stock farms.

State farms are confronted with the problem of completely eliminating during the Second Five-Year Plan period the shortcomings which have arisen by reason of their extreme specialization.

In order that pastures, coarse forage difficult to transport and waste products of grain production may be rationally utilized, cattle-raising must be extensively developed on grain and other specialized State farms.

With this end in view supplementary auxiliary branches of stock-raising are being introduced on the present State stock farms: cattle-raising on State sheep and hog farms, sheep and hog-raising on the State dairy and beef-cattle farms. According to the Plan the number of sheep on the State beef-cattle and grain farms will increase to 2,100,000 in 1937 mainly by raising the number of cross-bred castrated wethers. The castrated stock will be kept on the State farms for 4 or 5 years for wool production and thereafter fattened for meat.

The development of sheep-raising as an auxiliary enterprise of State grain and beef-cattle farms provides an additional 4,800 tons of wool to be received from these farms in 1937.

The number of cattle on the State grain farms must be raised to 350-400,000 by transferring to the latter part of the livestock on the State dairy and beef-cattle farms, after which their herds must increase by their own reproduction.

It is necessary to strengthen considerably the State farms situated in the zone of new meat-packing plants under construction or of plants already built, of bacon factories or dairies. The same applies to State farms which supply whole milk to industrial centres.

The capital investments planned for State stock farms provide for the completion of the building up of all present State farms, for the complete mechanization of the processes of forage procurement, forage preparation, water supply and to a considerable extent for the use of electrical milking and shearing.

Up to 65-70 per cent of the sheep on the State farms will be clipped by mechanical means and a considerable number of the

cows on State farms will be milked by electrical milking machines.

State farms must be better organized and must proceed in accordance with the projects which have been worked out and approved for each State farm and which provide for their complete organizational and economic consolidation.

The projects must specify definite time limits for the completion of separate jobs, must set a date for the completion of construction as a whole as well as the delivery of each State farm in finished form to a special Government commission in the same manner in which delivery is made of newly built industrial establishments.

The Plan provides for considerable investments in construction for housing, cultural and social purposes and for increasing credits to workers building their individual houses. Of special consideration is the problem of providing better living quarters for specialists.

Considerable amounts are also being invested in the construction of stock barns, hoggeries, sheepfolds and water supply systems.

The State farms must ensure an ample supply of good water for their livestock. It is planned already within the next few years to organize the piping of water to most of the State hog and State dairy and beef-cattle farms, also the mechanical supplying of water direct to the stock barns. The sum of 190,000,000 rubles has been appropriated to organize the water supply for the State stock farms.

Among other measures calculated to consolidate the State farms organizationally and economically, the following are of particular importance: introduction of a strict cost accounting system, strengthening discipline in matters of financial and budgetary planning and carrying on a very resolute struggle to reduce production costs.

The collective stock farms must play a decisive part in improving and developing stock-raising. The special collective stock farms formed during the last few years have shown that they are the best form in which to organize cattle-raising on the collective farms. The Plan accordingly provides that all the specialized livestock of the collective farms be constituted into special collective stock farms.

In order to increase the material interest of the collective farmers in the development of the collective stock farms it is

planned that collective farmers having collective stock farms be granted increased advantages with regard to the delivery of livestock products to the State and be secured in their absolute right freely to dispose of their livestock products after fulfilling their obligations to the State. The Plan provides for a further increase in the livestock of the collective stock farms not only by reproduction within their own herds but also by purchasing cattle from State farms and collective farmers, for which purpose considerably increased State credits have been appropriated.

Numbers of Livestock on Collective Stock Farms
(In millions, as of the spring of the year indicated)

	1932	1937 [1]	1937 in % of 1932
Cattle	6.1	9.2	150.8
of which:			
Cows	2.1	4.2	200.0
Hogs	2.5	9.6	384.0
Sheep and goats	4.5	27.6	613.3

[1] Subject to correction because of the transfer of part of the cattle and calves from the State farms to the collective stock farms, and because of the augmentation of the herds of the latter by actual purchases from collective farmers.

Besides replenishing their own herds, the collective stock farms must render aid to the collective farmers who have no cattle by providing them with heifers and young small stock of every description.

In the further organizational and economic consolidation of the collective stock farms, chief stress must be laid on improving the quality of their work, on rendering them more profitable, on enhancing the pure-breeding, cross-breeding and selection of the stock and the shift to its proper feeding and maintenance.

In order that the quality of the livestock on the collective stock farms may improve more rapidly and that the available pure-bred stock may be better utilized, it is necessary to focus attention on the consolidation of the existing network of the State pure-bred stock-rearing farms (the Sychevsk, Kholmogorsk and other farms), as well as on the organization of new pure-bred stock-rearing farms in districts having pedigreed and improved cattle. Districts having pure-bred stock-rearing farms must become exemplary with respect to cattle-raising. All State pure-bred stock-rearing farms must be provided with cadres and the necessary equipment.

The organization of labour represents the central problem in consolidating the collective stock farms organizationally and economically. Stock-raising brigades must be formed on all these farms. Their personnel must be carefully selected and be retained in permanent jobs. The number of work days credited must be based on piecework and be made dependent on the number of cattle attended to and the results achieved. Additional work days must be credited and bonuses in kind in the form of young livestock must be granted for overfulfilling all indices of the Plan, while financial responsibility must be fixed (by deduction of work days) for death losses of young cattle, barrenness or qualitatively deficient work.

The Second Five-Year Plan makes provision for considerably increased State aid to collective farmers, for the erection of stock barns, for water supply and the mechanization of the processes of forage preparation on the biggest collective stock farms.

The mastery of production on the collective stock farms must lead to a considerable rise in the main productivity indices of their herds, as appears from the following figures:

Productivity Indices of Livestock on Collective Stock Farms

	1932	1937	1937 in % of 1932
Milk yield per cow (kg.)	800	1,500	187.6
Average weight on hoof of cattle fattened for meat (kg.)	155	220	141.9
Average weight on hoof of hogs (kg.)	56	90	160.7

By the end of the Second Five-Year Plan period the output of the collective stock farms will exhibit the following growth: meat and fat derived from the three main classes of livestock (cattle, sheep and hogs) will increase almost 3-fold in comparison with 1932; milk—3.5-fold and wool—almost 6-fold. As a result of the planned increase in the herds and the improvement in the qualitative indices, the share of the State farms and collective stock farms in the total commodity production is increasing as follows: for meat—from 27.4 per cent in 1932 to 57 per cent in 1937, and for milk—from 42.2 per cent to 61.8 per cent.

The share of the State farms and collective stock farms in centralized procurements will constitute 71 per cent for meat and 63.6 per cent for milk In 1937 commodity meat output of the State farms and collective stock farms will constitute 88.7 per cent of the total cattle-raising commodity production in 1927-28.

while for commodity milk production the corresponding figure is 123.4 per cent.

Indices	Total volume of commodity livestock production for 1927-28	Commodity production of State farms and collective stock farms in 1937		
		State farms	Collective stock farms	Total
Meat from three main classes of livestock exclusive of offal (thousand tons)	1,246	614.5	490.4	1,104.9
Milk (thousand tons)	4,830	2,490.0	3,470.0	5,960.0

It is planned to further develop the measures outlined in the decisions of the Communist Party and of the Government concerning the extension of aid to collective farmers who do not possess cows. The Five-Year Plan makes provision for the transfer of the following young stock to the individual possession of the collective farmers: from collective stock farms—2,000,000 heifers, 12,700,000 young pigs, 1,200,000 lambs; from State farms—up to 4,500,000 young pigs. This in conjunction with the maintenance and raising of young stock by the collective farmers themselves will give rise to a qualitative improvement and a considerable numerical increase in the livestock possessed by the collective farmers.

Increase in the Number of Cattle in the Private Possession of Collective Farmers

(in millions, as of the spring of the year indicated)

Kinds of stock	1932[1]	1937	1937 in % of 1932
Cattle	26.1	44.9	172.0
of which:			
Cows	15.5	19.0	122.6
Hogs	5.7	27.1	471.3
Sheep and goats	32.3	53.5	165.7

[1] Inclusive of cattle of individual farmers.

The carrying out of the measures outlined is being ensured by extensive State credits to collective farmers who acquire calves and by the grant of a number of advantages to collective farmers who raise cows and heifers and sell them to collective stock farms at Government prices.

It is planned that the collective and individual farmers develop the raising of poultry and rabbits on a large scale and that they be afforded aid by being supplied with young poultry from the State and collective poultry farms, and with rabbits from the rabbit farms.

In the field of sheep-raising, provision has been made for a maximum increase in the flocks and for their great qualitative improvement so as to increase the quantity and improve the quality of wool obtained

According to the Plan, 42,600,000 sheep are to be cross-bred, 11,700,000 of which are to be derived from State farms.

The improvement of sheep raising in the northern districts of the U.S.S.R., where at present big flocks of sheep have been concentrated, must receive particular attention.

As a result of cross-breeding the number of cross-bred sheep on the collective stock farms must by the end of the Five-Year Plan period be raised to 6,000,000 and the number of those in the private possession of collective farmers—to 6,500,000. The great increase in the number of fine wool and semi-coarse wool sheep brings with it a considerable structural change in the quality of wool.

Classes of Wool
(in percentage of total)

Years	Fine	Semi-coarse	Coarse	Total
1932	5.8	5.2	89.0	100.0
1937	11.4	32.6	56.0	100.0

Horse-raising occupies a specially important place in the Second Five-Year Plan.

The decrease in the number of horses and the unfavourable composition of the stock (shortage of young stock for replenishment) enhances the importance of properly organizing mating in conjunction with the maximum utilization of dams for reproductive purposes, and of vigorously pursuing the fight against miscarriages and death losses of colts. The principal factor in solving these problems consists in properly organizing labour, in selecting reliable stablemen for the collective and State farms and giving them a material interest in the increase of the number of foals and in their maintenance.

In order to enhance the material interest of the collective

farmers in the raising of colts, it is provided that collective farms which rear the quota of colts assigned to them by the State be granted a number of advantages in grain deliveries and priority on the list of farms to be served by the machine and tractor stations.

In raising the quality of horses the deciding role belongs to the State stud farms and the collective stud farms on which a considerable number of pure-bred horses have been concentrated, as well as to the mating stations organized on the basis of these farms.

Pure-Bred and Improved Horses on State and Collective Stud Farms
(In thousands, as of end of year indicated)

Indices	Total number of horses		1937 in % of 1932
	1932	1937	
State stud farms	96.0	181.3	188.8
Collective stud farms	225.5	641.5	288.3

The task of effecting a sharp improvement in the qualitative indices of stock-raising squarely poses the question of creating a firm forage base during the Second Five-Year Plan period.

The Plan provides for a considerable increase in the forage supply for cattle and the elimination of the albumin shortage. This result is to be achieved by the sowing of perennial grasses in crop rotations, part of which will be used to feed the stock during the summer; also by carrying out a broadly conceived program for the improvement of meadow lands and pastures.

To those collective farms which assigned special areas for grain-forage and potato crops for the collective stock farms it is planned to grant valuable advantages in the delivery of grain and other produce to the State.

While the cultivated hay area is being increased by 2,400,000 ha., the perennial grass area is rising from 3,800,000 ha. in 1932 to 6,900 000 ha. in 1937.

The area under root crops is extending rapidly—from 726,000 ha. in 1932 to 900,000 ha. in 1937. The quantity of silage is planned to grow to 23,500,000 tons in 1937 as against 9,100,000 tons in 1932. Forage roots are to exhibit an increase in yield of from 106.9 centners per hectare in 1932 to 240 centners in 1937, a rise of 124.7 per cent.

In order to overcome the acute shortage of perennial grass seeds, particularly those for meadow and pasture lands, it is im-

perative that, in addition to developing the old seed-growing districts and to sowing new stretches of land to seed, each collective and State farm proceed to grow seed and collect wild-growing grass seeds so that it may be able to satisfy its seed requirements to a maximum with locally grown seeds.

The introduction of proper crop rotation and the application of agronomic measures to the cultivation and harvesting of sown grasses must raise their yield from 18.5 centners in 1932 to 32.6 centners in 1937 (by 76 per cent).

Increased yield of meadows and pastures represents a highly important problem for the development of stock-raising.

Meadow and pasture lands must be improved over an area covering 29,500,000 ha., which will increase the productivity of the meadows by 20 to 25 per cent and of the common pastures by 15 per cent. In addition, 425,000,000 centners of concentrates will be made available in 1937 for stock-raising, 320-350,000,000 centners of which will be grain concentrates. The production of tankage and concentrated forage from waste products of the food industry is assuming considerable proportions.

All this gives rise to marked structural changes in the rations fed to the stock. The proportion of concentrates and succulent forage is increasing while that of straw in the coarse forage is decreasing.

In comparison with 1932 the increase in grain forage resources per head of livestock (reduced to heads of large cattle) is 67 per cent, and in succulent forage resources—122 per cent.

The Plan specifies that the veterinary system be consolidated and extended, especially in the eastern districts, that prophylactic measures be carried out on a mass scale and that cattle plagues be largely exterminated. It is planned to increase considerably the number of veterinary colleges, greatly to improve the material welfare of the existing cadres and to extend the material base of the veterinary service.

For the fulfilment of the stock-raising program which stipulates such tremendous advances during the Second Five-Year Plan period it is imperative that the Communist Party and Soviet organizations, that the vast masses of the toilers mobilize all their forces for a persistent day-to-day struggle for every item in the Plan, exerting the same energy that the entire country displayed and is still displaying in its struggle to solve the grain problem.

* * *

During the years of the Second Five-Year Plan period Soviet agriculture is completing the process of socialist reconstruction. Having become the largest-scale agriculture in the world under the First Five-Year Plan, it is now, during the Second Five-Year Plan period, advancing to first place in the world in volume of production of its principal branches, in degree of mechanization and in level of technique.

The complete and final victory of socialism in the countryside, the completion of collectivization and the final liquidation of the kulak as a class, the transformation of agricultural labour into a variety of industrial labour, the transformation of all collective farmers into well-to-do husbandmen and the overcoming of the survivals of capitalism in the economic life and in the minds of people are a guarantee that during the second quinquennium the productive forces of agriculture will thrive abundantly and that all the prerequisites are being created for the abolition of the contrast between town and counry.

TRANSPORTATION AND COMMUNICATION

THE huge increase in production, both industrial and agricultural, the rapid rise in the culture and well-being of the toilers of town and country and the tremendous growth of intercommunication between town and country bring to the fore during the Second Five-Year Plan period new problems of vast importance in the field of freight and passenger transportation.

The solution of these problems requires that the lag of transportation behind the general rates of development of Soviet national economy be overcome as quickly as possible by accelerating the rates at which the material and technical base of transportation is being reconstructed and by effecting thoroughgoing organizational changes along the lines indicated in the resolution of the Seventeenth Congress of the Communist Party.

Complete elimination of bureaucratic routine methods of executive management, of the functional system of administration, the concentration of engineers and technicians in active field work in the railroad stations and shops, decided qualitative improvement in repairs made to transportation facilities, tightening of labour discipline and reorganization of Communist Party and mass work for the purpose of enhancing revolutionary vigilance represent the prime conditions necessary for the mastery of technique, for an improvement in the quality of work and the mobilization of all internal resources of the transportation system.

The successful accomplishment of the tasks imposed upon the transportation system during the Second Five-Year Plan period calls for the radical reconstruction of all forms of transportation facilities, particularly of railway transportation, and requires that there be an increase in the proportion of waterway, motor and airway transportation as well as in the network of oil and oil products pipe-lines, while concentrating on the reconstruction of the principal trunk lines.

The rapid growth of intra-district and inter-district transportation routes requires careful co-ordination of the different forms of transportation by improving the planning of traffic, overcoming seasonal peaks and eliminating cross-hauls; also by reconstructing

junction points (branch feeding lines, bridges, ports, transfer points, mechanization of freight loading and unloading) and by effecting a proper geographic distribution of storage facilities.

During the Second Five-Year Plan period railway transportation is retaining its basic, leading role in the development of inter-district communication in the U.S.S.R. The heavy freight shipments moving from the western section of the U.S.S.R. to the East, from the European part of the U.S.S.R. to Central Asia and from Krivoy Rog to the North *via* the Donetz Basin are to be handled mainly by the railroads.

During the Second Five-Year Plan period river shipping which is to relieve the railroads of part of the inter-district traffic, especially between the North and the South, is also confronted by a serious task. In this connection the Volga and the Dnieper river systems acquire great importance. River transportation will play a decisive role in supplying direct service to the regions of the North, Siberia, the Far East and a number of outlying districts where waterways continue to be the principal and often the sole means of transportation.

In order to break through the isolation of highly important river basins and provide outlets from these to other districts of the Soviet Union, it is planned to interconnect a number of such basins by means of hydro-technical engineering structures and by joining waterway shipping points and railroad lines.

Marine transportation, the main form of freight transportation connecting the U.S.S.R. with the outside world, must likewise play a big role during the Second Five-Year Plan period in inter-district communication between the North and South of the U.S.S.R. (Baltic and Black Seas); between European U.S.S.R. and the Far Eastern portion of the U.S.S.R.; between the Ukraine, the Crimea, North Caucasus and Transcaucasia; between Transcaucasia, Central Asia, the Volga regions and Kazakstan, as well as in intra-district communication along the sea coast of the U.S.S.R.

In the development of intra-district communication motor transportation plays an especially important role, as it represents one of the principal means of short-haul shipment. By extending the unified transportation network of the country while at the same time discharging its independent function of short-haul carrier, motor haulage will relieve railway and waterway carriers of shipments which are less economical for the latter, such as short-haul and small-lot shipments subject to repeated handling.

Motor transportation, while providing for the transfer of goods from points of production to main traffic arteries and from the latter to points of consumption, will also be used on a vast scale to serve various production processes both in industry and agriculture.

At the same time a considerable network of automobile highways is to be built during the Second Five-Year Plan period, primarily in the districts where railway and waterway transportation are inadequately developed or altogether lacking; also in newly developed outlying regions in order to connect them with the principal transportation network of the Soviet Union.

During the years of the Second Five-Year Plan period, airway transportation is undergoing rapid development, mainly to establish connection between outlying districts and large industrial centres. The airway transportation system has been assigned the task of independently serving a number of districts remote from the principal transportation network of the U.S.S.R. Aeroplane transportation will develop to a maximum the transportation of industrial freight of suitable weight and dimensions as well as of mail, obtaining almost a monopoly of distant postal shipments.

* * *

In 1937 railroad traffic will increase to 300,000,000,000 ton-km. as against 169,300,000,000 ton-km. in 1932, an increase of 77.2 per cent. Traffic over rivers in 1937 will total 63,000,000,000 ton-km. as against 26,100,000,000 ton-km. during the last year of the First Five-Year Plan period, an increase of 141.4 per cent. The volume of maritime shipping is growing to 51,000,000,000 ton-km. as contrasted with 18,200,000,000 ton-km. in 1932—an increase of 180.2 per cent. The amount of truck traffic will increase to 16,000,000,000 ton-km. as against 1,070,000,000 ton-km. in 1932, *i.e.*, a 15-fold increase which will ensure a sharp rise in the percentage which motor-haulage represents in the combined volume of freight moved by trucks and horse-drawn vehicles. Parallel with this, the volume of airway shipments is also growing rapidly. Thus in 1937 the volume of postal matter carried by aeroplane will increase to 68,500 tons, or a 159.4-fold increase over 1932, while that of freight carried by aeroplane will rise to 26,500 tons, a 59.3-fold increase in comparison with 1932.

In accordance with the planned increase in freight shipments as indicated above, the proportion of freight (in ton-km.) allotted to the various classes of carriers is changing as follows:

Modes of transportation	1932 (percentage of total freight)	1937
Railroads	78.9	69.8
River shipping	12.2	14.6
Maritime shipping	8.4	11.9
Motor haulage	0.5	3.7

Thus, the share of railway transportation in the country's total freight traffic is dropping, though there is a considerable increase in absolute figures, while the share of river shipping, maritime shipping and motor haulage is increasing. The latter is exhibiting the most rapid proportionate increase.

The rising importance of inter-district connections during the Second Five-Year Plan period, particularly in view of the enhanced role played by the new districts in the economy of the Soviet Union, necessitates an especially great increase in freight traffic on the most important trunk lines connecting West Siberia with Central Asia, the Urals with the central part of the U.S.S.R., the Ukraine with the principal industrial centres of the Soviet Union (the Moscow and Leningrad Regions) as well as with the Gorky and Northern Territories, the Urals, the Lower Volga, etc.

In addition to this, tremendous volumes of freight will circulate on the lines within the Donetz Basin, the Kuznetsk Basin, the Urals and the outlets from Karaganda.

In river transportation the most important streams of traffic, consisting principally of oil, coal and timber, are being concentrated on the Volga, in the north-western basin and on the largest river highways of the Northern Territory, Siberia and the Far East.

The more intensive utilization of the Siberian and Far Eastern river lines and the increase in the distance which timber and grain shipments are carried over the main water trunk lines of the Soviet Union (the Volga, Dnieper, etc.) have the effect of lengthening the average haul in river shipping to 700 km. as against 562 km. in 1932.

Due to the further industrialization of the U.S.S.R., the relative importance of industrial freight is growing with great rapidity. While the total volume of freight shipped over the railroads is increasing by 77.2 per cent during the five years, the amount of coal carried is increasing 2.2 times and that of iron and steel—2.4 times. Analagous changes in the composition of freight shipments are also occurring in river shipping. Thus, while the total volume of interior river freight is growing by 93.8 per cent, the

quantity of coal shipped over rivers is multiplying 6 times and that of oil—2.4 times.

The huge growth during the Second Five-Year Plan period of passenger traffic which calls for a considerable increase in and reconstruction of all transportation facilities and for an all-round improvement in the service given to passengers at railroad terminals, air-ports and sea-ports, also imposes great responsibilities upon every class of carrier.

The further improvement in the material condition of the toiling masses of the U.S.S.R. and the elevation of their cultural level give rise to a further increase in passenger traffic in all forms of transportation. The total volume of passenger traffic has been set at 1,390,000,000 persons in 1937 as against 1,014,000,000 persons carried in 1932, which denotes an increase of 37.1 per cent.

The following is the number of passengers which it is planned to transport, distributed according to mode of transportation:

Modes of transportation	1932	1937
	(million passengers)	
Railroads	966.6	1,309.5
River shipping	43.6	74.0
Maritime shipping	3.7	5.6
Aircraft	0.03	0.665

The huge increase in the volume of freight and passenger traffic specified in the Plan emphasizes the necessity of the technical reconstruction of transportation facilities, of considerably strengthening their technical base and of decidedly improving the quality of their work.

RAILWAY TRANSPORTATION

THE carrying out during the Second Five-Year Plan period of the radical reconstruction of railroad facilities and the mastering of their newly created material and technical base make it possible not only to overcome completely the difficulties encountered during the past few years in the management of freight on the most important railroad trunk lines, but also to set up considerable reserves in carrying capacity. Only secondary railroad lines will continue to operate under relatively great strain; these carriers however will be sufficiently reinforced to give completely satisfactory service to the most important trunk lines to and from which they are to carry freight and passengers.

The reconstruction of the railroads is proceeding along the following main lines: the shift on a number of lines from the use of steam engines to that of electric and Diesel locomotives, introduction of powerful locomotives, large-capacity freight cars, automatic brakes, automatic couplings and automatic block signals, the laying of heavy rails, change from sand to crushed stone or gravel ballast, increase in the number of ties on the main lines, installation of anti-creepers, mechanization of the most laborious processes of work, etc.

The volume and allocation of capital investments planned for railroad reconstruction are given in the following table:

Allocation of capital investments	Absolute figures (billion rubles)	Percentages
Total capital invested within the system of the P.C. of Transportation	18.70	100.0
of which:		
Lines in operation	10.12	54.1
New lines	2.67	14.3
Housing construction	0.77	4.1

Thus, more than half of the total capital invested has been allocated to lines in operation, expenditures for which are increasing most rapidly, which is characteristic of the concentration of investments in the most important trunk lines in operation.

Increased quantities of metal are being allotted to the railroads commensurate with the increased requirements of their construction plan. Instead of the 4,600,000 tons of rolled metal assigned to the railroads during the First Five-Year Plan period, they are receiving 14,400,000 tons during the Second Five-Year Plan period. Accordingly the proportion of rolled products (rails, metal products for maintenance and repair and metal going into equipment and rolling stock) absorbed by the railroads is increasing from 26.1 per cent during the First Five-Year Plan period to 30.7 per cent.

A most important element in the technical reconstruction of railway transportation is the rolling stock, the renewal and augmentation of which during the Second Five-Year Plan period have been planned to assume such dimensions as will ensure the installation on the railroads of the technically most perfected transportation equipment.

During the Second Five-Year Plan period the railroads are acquiring 5,861 freight locomotives, 2,375 of which are type "FD" engines (20-ton axle load), and 3,486 type "E" freight locomotives in addition to 1,630 type "SU" passenger locomotives, 255 type "JS" passenger locomotives, 350 electric locomotives and 248 Diesel locomotives.

As a result of these additions to the stock of locomotives, the powerful "FD" engine is becoming the basic type of freight locomotive under the Second Five-Year Plan instead of the weak "OD" engine which prevailed at the beginning of the First Five-Year Plan period, and of the "E" engine which prevailed throughout the First Five-Year Plan period. This plan likewise ensures a considerable increase in technically more advanced tractive power in the form of electric and Diesel locomotives, as well as an increase in the number of passenger locomotives, the manufacture of which lagged somewhat during the First Five-Year Plan period.

The "JS" engine is becoming more and more the principal type of passenger locomotive in place of the "SU" engine which predominated during the First Five-Year Plan period.

Under the Second Five-Year Plan, the railroads will likewise receive 110,000 large-capacity freight cars and 12,500 passenger cars, inclusive of 780 electric cars. During the said period the vast majority of cars manufactured will be of the large-capacity type. Thus, the large-capacity 4-axle freight car is becoming the basic type which, with better car utilization (maintenance and repairs),

will completely satisfy the car requirements of the People's Commissariat of Transportation.

The changes which are occurring in the rolling stock with respect to quantity and capacity due to increase in number of locomotives and cars are shown in the following table:

Indices	Jan. 1, 1933	Jan. 1, 1938	1937 in % of 1932
Freight locomotives (units)	16,350	19,809	120.7
Total tractive power of freight locomotives (thousand tons)	196.2	298.0	151.8
Average tractive power per freight locomotive (tons)	12.0	15.0	125.0
Passenger locomotives (units)	3,125	4,740	151.6
Total tractive power of passenger locomotives (thousand tons)	26.4	43.7	165.5
Freight cars (thousands)	507.9[1]	645.0	126.9
of which: 4-axle freight cars (thousands)	45.0	155.0	344.4
Freight cars, in 2-axle equivalents (thous.)	552.0[1]	800.0	144.9
Total load capacity of freight cars (million tons)	9.5[1]	15.8	166.3
Passenger cars (thousands)	29	41.0	141.3

[1] As of beginning of 1932.

At the end of the Second Five-Year Plan period, the U.S.S.R. will have 26.1 locomotives per 100 km. of operating lines as against 23.4 locomotives on January 1, 1933, and 14.8 locomotives in the U.S.A. in 1929, 44.8 in Germany, 47.5 in France and 30.7 in Japan. The total tractive power of the locomotives per 100 km. of operating lines will be 363.5 tons as against 267.2 tons on January 1, 1933, and 295 tons in the U.S.A. in 1929.

In the U.S.S.R. there will be 686 freight cars (in actual units) per 100 km. of line on January 1, 1938, as against 610 in 1932, 670 in the U.S.A. and 1,200 in Germany in 1929.

The load capacity of freight cars per 100 km. of operating lines will total 16,800 tons by the end of the Second Five-Year Plan period as against 11,405 tons in 1932, 27,500 tons in the U.S.A., 20,000 tons in Germany, 20,200 tons in France and 6,290 tons in Japan (1929).

In order to effect so great an increase in railroad rolling stock, introduce new types of locomotives and cars and put the repair of locomotives and cars on a radically improved basis, it is neces-

sary to reconstruct the existing railroad shops and build a number of new shops for the repair of rolling stock and the manufacture of spare parts.

It is therefore contemplated to build during the Second Five-Year Plan period 12 new locomotive and car repair shops with an aggregate annual repair capacity of 3,050 locomotives, 66,000 freight cars (complete overhauling) and 17,000 passenger cars (complete overhauling or partial repairs).

In addition, provision is made for the construction of a number of locomotive repair depots, and for the radical reconstruction of a number of the existing repair shops.

The outlined construction of new shops and reconstruction of existing shops make it possible to raise the total capacity of repair shops and repair stations so as to be able to completely overhaul 7,880 locomotives and 126,000 cars, and make partial repairs to 130,000 cars. The passenger car repair capacity will be increased to 25,000 cars requiring partial repairs or complete overhauling.

The reinforcement of the railroad repair bases to the extent indicated is planned to put all locomotives and cars in a good state of repair as required by the decision of the Central Committee of the Communist Party and the Council of People's Commissars dated July 23, 1933.

Whereas in 1932, 3,120 locomotives or 16 per cent of the total number received first, second or third class repairs at repair shops, in 1937, 7,800 locomotives or 31.8 per cent of the total number are planned to undergo complete overhauling in accordance with higher standards and norms.

In 1932, 14,000 freight cars or 2.7 per cent of the total number were repaired in workshops while 131,500 freight cars underwent standard inspection at various points on the lines not as well equipped as the repair shops. In 1937, it is planned to have 95,300 freight cars undergo complete overhauling at the repair shops and 95,000 cars undergo partial repairs, which will constitute 29.5 per cent of the total number.

All locomotives and cars are to be equipped with automatic brakes by the end of the Second Five-Year Plan period. Fifty per cent of all freight cars will have automatic couplings which will make it possible for all through-freight trains on the principal traffic lines to consist of cars equipped with automatic couplings.

The reconstruction of the road bed during the Second Five-Year Plan period is proceeding along the line of shifting to type

"1A" rails for a length of 7,000 kms. on the following lines: Kharkov-Nikitovka-Rostov, Donetz Basin-Krivoy Rog, Donetz Basin-Stalingrad, Axtafa-Batum and Perm-Chussovskaya-Sverdlovsk. The rails of lines served by type "FD" locomotives (20-ton axle load) or by Diesel locomotives will be replaced for a length of 13,000 km. by type "2A" rails. Tracks of this type will be laid on the following lines: Valuiki-Moscow, Moscow-Ryazan, Rostov-Prokhladnaya, Sverdlovsk - Kurgan, Chelyabinsk - Novosibirsk, Moscow - Kazan-Sverdlovsk, Kinel-Tashkent, Ursatyevskaya-Krassnovodsk, Stalingrad-Tikhoretskaya and Ilovaiskaya-Volnovakha-Zaporozhye. It is planned that the electrified railroads change to crushed stone ballast (about 1,000 cu. metres of crushed stone ballast per kilometre of track). Crushed stone ballast is also being introduced in part on lines served by "FD" locomotives. The number of ties per kilometre of track is increasing on electrified lines as well as on lines served by "FD" locomotives.

The following are the principal lines over which heavy steam locomotives or electric locomotives will be rum: Novosibirsk-Omsk, Chelyabinsk - Kartali - Magnitogorsk, Kinel - Orenburg - Tashkent, Kurgan-Sverdlovsk-Kazan-Moscow, Moscow-Kharkov-Liman-Nikitovka-Rostov-Prokhladnaya, Moscow-Ryazan-Kozlov-Rostov, Moscow-Yelets-Valuiki-Nyesvetai-Rostov, the Ural network and the Donetz Basin-Krivoy Rog network.

It is further planned to strengthen the road bed of lines which will be served by "JS" passenger locomotives.

The Second Five-Year Plan provides that large sums be invested in the reconstruction and reinforcement of existing bridges and the building of new bridges.

It is planned to erect new bridges on a vast scale across the principal rivers of the Soviet Union both on new lines under construction and on lines now in operation.

The total length of large metal bridges scheduled to be built during the course of the Second Five-Year Plan period is alone to exceed 25 km. The principal bridges here included are:

The Saratov bridge across the Volga, length 1,600 metres.

The Dniepropetrovsk bridge across the Dnieper, length 1,260 metres.

The Angara bridge for the Lena railroad, length 1,200 metres.

The Kremenchug bridge across the Dnieper, length 1,100 metres.

The Zeya bridge for the Ussuri railroad, length 1,093 metres.

The Don bridge for the Kiziterinka-Bataisk line, length 1,000 metres.

In order to speed up train movements and rationalize traffic, the Second Five-Year Plan for the reconstruction of the railroads also provides for a radical reconstruction of the systems of communication.

One of the most important steps in this direction is the installation of automatic block signals which not only makes for greater safety in train movements but considerably increases line capacity, especially on double track.

The Plan provides for the introduction of the automatic block signal system on 8,882 km. of line, which compares with 582 km. installed by the end of the First Five-Year Plan period. The freight lines of the Donetz Basin, the Kuznetsk Basin and the Chelyabinsk-Novosibirsk main line in Siberia, the main passenger trunk line Leningrad-Kharkov-Simferopol and the Kharkov-Yama-Nikitovka-Rostov-Makhach Kala line will be equipped with automatic block signals.

Furthermore, the Plan provides for the extensive use of semi-automatic block signals and rod exchanges on railroad lines, which will make it possible to completely discard the system of telegraphic communication in train dispatching by the end of the Second Five-Year Plan period.

The Second Five-Year Plan takes a decided stand in favour of introducing electric signalization and centralization as the most perfected method of operating switches and semaphores.

The mechanization of loading and unloading is an essential feature of the general plan for the reconstruction of railway transportation.

At the end of the First Five-Year Plan period only 18 per cent of freight was handled mechanically (loading, unloading, transshipping). At the end of the Second Five-Year Plan period 57 per cent of freight handling will be mechanized. For the principal items of freight constituting 60 per cent of the total freight carried, mechanized freight handling will exhibit the following percentages: grain—51 per cent, coal—64 per cent, ore—98 per cent, timber—43 per cent, and metals—74 per cent.

The mechanization of freight handling will be achieved by the reconstruction of warehouses and rolling stock (large-capacity, dump and other cars), the introduction of containers, etc.

With the introduction of powerful locomotives, the strengthen-

ing of the road bed and the reconstruction of the communication systems, the carrying capacity of the railroad lines will be considerably increased. In addition to this, the development of electrification, one of the most important features in the reconstruction of railroad transportation, is a major factor in increasing the capacity of railroad sections suffering from a congestion of freight and passenger traffic. During the Second Five-Year Plan period, 5,000 km. of railroad line will be electrified and opened to traffic as against 3,600 km. in operation in the U.S.A. in 1931. Of the total electrified trackage, 4,306 km. will be trunk lines (including 136 km. of experimental lines) while 579 km. will be devoted to suburban and health resort traffic (leaving 115 km. unassigned).

Of particular importance is the electrification of the Transcaucasian railroad lines running from Axtafa to Batum, from Byelorechenskaya to Tuapse in the Northern Caucasus (crossing mountain passes over difficult grades) and lines of similar type in the Urals (the Solikamsk-Kizel-Chussovskaya-Perm, the Chussovskaya-Sverdlovsk and the Ufa-Magnitogorsk lines). Electrification of the Sverdlovsk-Chelyabinsk line is also to be begun.

It is further planned to electrify the trunk lines traversing the Donetz Basin and constituting its backbone (the Osnova-Yama-Nikitovka-Ilovaiskaya-Rostov and the Yasinovataya-Debaltsevo-Likhaya lines), the Dnieper Area lines (Yasinovataya-Chaplino-Zaporozhye and Chaplino-Dniepropetrovsk) and the entire Dnieper Area ring (Dniepropetrovsk-Dolgintsevo-Zaporozhye) as these lines are the most overburdened freight arteries.

The Gukovo-Likhaya-Stalingrad line lying between the Donetz Basin and the Volga will be electrified. It is planned to electrify as well the principal lines of the Kuznetsk Basin: the railroads running between Byelovo and Stalinsk and between Kemerovo and Yelesino. Electrification of the Northern section of the Murmansk railroad (Murmansk-Kandalaksha-Loukhi) will be of great importance in raising carrying capacity. Electrification of the Siberian trunk line (the Omsk-Novosibirsk-Byelovo section) will be begun.

By the end of the Second Five-Year Plan period all freight traffic on most of the electrified lines above enumerated will be handled by electric locomotives while steam locomotives will be retained only for hauling passenger trains.

In the domain of suburban traffic served by motor-driven railroad cars, the head sections of lines abutting on large centres of

traffic (Moscow, Leningrad and Kharkov, the Mineralnye Vody Branch of the Northern Caucasus Railroad and the Sochi-Adler section with a branch line to Matsesta on the Black Sea Railroad) are to be electrified during the Second Five-Year Plan period.

The introduction of Diesel locomotives on the Krassnovodsk-Kazalinsk-Aktiubinsk and the Bataisk-Salsk lines by the end of the Second Five-Year Plan period will be of great importance in raising the carrying capacity of the railroads. By 1937, about 2,000 km. will thus be served by Diesel locomotives.

Much grade reduction work will be done during the Second Five-Year Plan period on the lines connecting Moscow with West Siberia *via* Perm and Kazan, on the Turkestan-Siberian Railroad between Novosibirsk and Lugovaya, partly on the Murmansk line, on the Kozlov-Rostov line and the Kotyelnich-Gorky line, one of the connections between the Urals and Moscow.

The laying of second tracks and the development of station and junction facilities will likewise increase the carrying capacity of the roads. Second tracks are being laid on 9,500 km. of main line now experiencing most difficulty. Particularly great is the construction work being done on the following trunk lines (in km.):

Urals-Kuznetsk Basin	1,000
Ka ymskay ı-Vladivostok	2,368
Volga Area-Donetz Basin and the Ukraine	1,083
Donetz Basin-Moscow	730
Donetz Basin-Leningrad	414
Syzran-Penz ı-Valuiki-Kupyansk	1,078
Centr l Asia-European districts of the U.S.S.R. *via* Kazalinsk	504
Vyatka-Sverdlovsk	860

In addition to this double-tracking of main lines, the Plan provides for the partial double-tracking of the most congested sections of certain other lines. The total length of yard tracks by the end of the Second Five-Year Plan period will be increased by 8,500 km.

The solution of the problem of completing the reconstruction of the railroad system also requires the building of new lines.

The plan for the second five-year period provides for the construction of 14,454 km. of new railroad lines, 11,000 km. of which are to be completed and opened to traffic during this period. Thus the total network under exploitation in the U.S.S.R. will be increased to 94,000 km. as against 83,300 km. in 1932 and 58,500 km. in 1913.

The construction of a number of immense trunk lines begins during the Second Five-Year Plan period.

The following are the biggest new railroad lines scheduled to be built:

1. A trunk line connecting the Pacific Coast with the Black and Baltic Seas and having a total length of about 12,000 km. The most important sections of this line will be completed and opened to traffic (permanently or provisionally) during the Second Five-Year Plan period, *viz.*, part of the Tynda-Permskoye on Amur section which provides a second outlet to the Pacific; the Taishet-Angara section, which will make it possible to begin to exploit the Angara forest areas and will, in the future, connect the Yakutian Autonomous Socialist Soviet Republic with the main railroad network of the Soviet Union; the Akmolinsk-Kartaly section which is to bring Karaganda coal to Magnitogorsk; the Gorky-Kazan and the Magnitnaya-Ufa sections which will absorb some of the traffic from the Moscow-Kazan line and establish direct connections between the Southern Urals and the industrial districts of the central portion of the U.S.S.R.; the Uralsk-Iletsk section which will relieve the present congested condition of the Kinel-Iletsk line.

2. The Donetz Basin-Moscow line (1,100 km.), which affords a third outlet for the stream of traffic flowing from the Donetz Basin to the industrial regions in the central part of the U.S.S.R.

3. The Donetz Basin-Leningrad line, a direct outlet for Donetz Basin traffic going to Leningrad without touching Moscow. Work on the Bryansk-Vyazma and the Smolensk-Soblago lines having a total length of 487 km. is being completed during the course of the Second Five-Year Plan period.

Communication between the Donetz Basin and the Krivoy Rog districts is strengthened by the building of two new lines: one from Grishino to Pavlograd and a second from Chaplino to Alexandrovsk, with an aggregate length of 214 km.

To improve the connections between Transcaucasia and the central part of the U.S.S.R., the Black Sea line (273 km.) will be completed and the construction of a new electrified trunk line over the main Caucasian mountain range will be begun.

The Plan provides for 879 km. of new timber-carrying lines in Siberia including one from Tomsk to Chulym.

Agricultural regions will be served by lines specified in the Second Five-Year Plan which at the same time will perform other

tasks in the economic life of the nation (Nyesvetai-Valuiki, Akmolinsk-Kartaly, Uralsk-Iletsk and other lines).

Besides, the railroad construction plan provides for a number of new lines to improve intra-district communication in such important areas as the Urals, the Kuznetzk Basin, the Donetz Basin, Krivoy Rog, Central Asia and Transcaucasia.

The realization of the complex of measures outlined ensures the radical reconstruction of the most important railroad lines, as appears from the following data:

1. The Krivoy Rog Donetz Basin line will be mostly four-track, electrified heavy rail with crushed stone ballast and automatic block signals.

2. The Donetz Basin-Moscow line *via* Yelets will be double-tracked on crushed stone ballast, will be equipped with semi-automatic block signals and served by type "FD" locomotives.

3. The Leningrad-Donetz Basin line *via* Bryansk will be double-tracked from the Donetz Basin to Bryansk; the rest of the road will consist of three single tracks and a reserve line through Moscow.

4. The Leningrad-Moscow-Kursk-Kharkov-Rostov-Prokhladnaya line will be double-tracked with heavy rails, automatic block signals will be installed and the powerful steam locomotives will be supplemented by electric traction on the most congested sections.

5. The Moscow-Urals line *via* Kazan will be double-tracked and have powerful locomotives, heavy rails, automatic and semi-automatic block signals.

6. The Leningrad-Urals line will be double-tracked part way, will have reduced grades and automatic and semi-automatic block signals in the most difficult sections.

7. The Ural-Kuznetsk Basin line will be double-tracked with heavy rails, automatic block signals will be installed and the line will be served by powerful locomotives.

8. The Moscow-Central Asia line *via* Kazalinsk will be double-tracked in the most congested sections, will be provided with powerful locomotives and its grades will be reduced.

The radical reconstruction of the railroads which is being accomplished on the basis of technically re-equipping the lines (introduction of powerful locomotives, electric locomotives, Diesel locomotives, large-capacity cars, automatic coupling, automatic brakes, automatic block signals, mechanization, improved communication, developed junctions and terminals, reconstructed

road-bed, etc.), the increase in the number of trained personnel of the railroad service and the better technical direction of all departments of railroading make possible a decided improvement in the manner and methods of exploiting and utilizing the rolling stock.

The following data illustrate the improved utilization of railroad rolling stock:

The average daily run per working freight locomotive, including all types, will be 180 km. in 1937 as against 146 km. in 1932;

The average daily run per freight car will be 125 km. in 1937 as against 97.3 km. in 1932;

The average daily run per passenger locomotive, including all types, will be 290 km. as against 224.0 km. in 1932;

The average daily run per passenger car, including all types, will be 400 km. as against 326.3 km. in 1932.

The planned indices for the utilization of the rolling stock and the railroad network are also highly indicative of the extent to which the new material base of the railroad system will be mastered:

Indices	1932	1937
Freight carried per ton of tractive power of locomotive (tons)	1,366	1,594
Freight carried per ton of load capacity of freight car (tons)	28.2	30.0
Freight carried per km. of line in terms of ton-km. (million ton-km.)	3.0	4.4

The fulfilment of the Second Five-Year Plan fully ensures the elimination of the lag in railroad transportation and will put the Soviet railroads on a par with the best lines of the most advanced capitalist countries.

WATERWAY TRANSPORTATION

IN the field of waterway transportation, the Second Five-Year Plan provides for the building on a vast scale of artificial water channels and for immense hydro-technical construction which "in the main guarantee the reconstruction of the waterways and the creation of a unified waterway system for the European part of the U.S.S.R." The lengthening of the waterways must be accompanied by an improvement in the conditions for navigation. "The maritime and river fleets must be radically renewed and reconstructed" (Resolution of the Seventeenth Congress of the Communist Party) and all transportation work must be decidedly improved.

The total capital to be invested within the system of the People's Commissariat of Waterway Transportation has been fixed at 4,245,000,000 rubles by the Second Five-Year Plan, which includes 3,029,000,000 rubles for waterways in operation and 1,216,000,000 rubles for a complex of hydro-technical construction for navigation purposes.

It is planned considerably to expand the navigated waterway system, enlarging it from 84,000 km. in 1932 to 101,000 km. in 1937. This increase in navigated waterways is to be achieved by the inclusion of secondary rivers and tributaries as well as of the principal rivers of the Far Eastern Territory and the North (Khatanga, Yana, Indigirka, Kolyma, Pyassina, etc.).

A considerable improvement in navigation conditions on the waterways under exploitation has been planned. Thus, all waterways in use will be completely supplied with day-time warning signals. In 1937, 79,700 km. will have lighting at night as against 47,300 km. in 1932. The length of regularly dredged waterways is increasing from 27,100 km. during the First Five-Year Plan period to 41,200 km. in 1937.

In addition to extending the network of natural river-ways and improving the conditions under which they are exploited, the Plan also contemplates a considerable increase in the total of artificial

waterways. Construction of the latter is planned on such a vast scale as is unprecedented in the history of navigation of even the foremost capitalist countries.

Already during the first year of the Second Five-Year Plan period the White Sea-Baltic Canal was opened to navigation. This new traffic artery connects the Baltic and White Seas, giving Leningrad a direct water route to the North and thus rendering unnecessary the circuitous route by way of the Baltic Sea and the Atlantic Ocean.

The length of the White Sea-Baltic Canal, from the port of Povenets on Lake Onega to Soroka on the White Sea, is 227 km. This new waterway has greatly increased the possibility of accelerating the exploitation of the northern seas and is a powerful lever for raising the productive forces of the Soviet North. Along this new route ply vessels carrying oil and coal from the Pechora Territory, Khibini apatites, timber and mineral ores from the rich forests and mines of the Karelian Autonomous Socialist Soviet Republic, grain and other freight.

The construction of the Volga-Moscow River Canal having a length of 127 km. is also planned for the Second Five-Year Plan period. This new canal will be a very important highway navigable to vessels of considerable draught. It will greatly improve Moscow's transportation service and at the same time completely satisfy the tremendous, ever growing water requirements of Moscow's industries and population.

In order that the great transportation facilities created by the building of the White Sea-Baltic and the Volga-Moscow Canals may be completely utilized, a thorough reconstruction of the existing Mariinsk and Moscow River waterways is imperative. Both of these systems at present have worn-out, antiquated equipment, their capacity is small and their waters too shallow, which is altogether at variance with the proper exploitation of these channels.

The Mariinsk system (the Volga-Baltic waterway) is the connecting link between the most important main-line waterways: Volga-Leningrad, the Volga-Moscow Canal, the White Sea-Baltic Canal and the Northern Dvina. The present technical facilities and carrying capacity of the Mariinsk system (3,000,000 tons in that portion where the sluices follow in close succession) are inadequate to absorb the increasing traffic. The Second Five-Year Plan period is therefore to witness the beginning of the radical reconstruction of this system.

The first section of this work provides for the reconstruction of the closely sluiced portion of the system (the Vyterga River, the New Mariinsk Canal, the Kovzha River and the White Lake Canal)—a length of 208 km. which is the least adequate from a technical point of view and restricts the carrying capacity of the entire system. The second section concerns the reconstruction of the rest of the Mariinsk system so as to correspond to the new capacity of the closely sluiced section.

In the third section it is planned to complete the reconstruction of the Mariinsk system by deepening the entire length of the channel.

During the Second Five-Year Plan period the work required for the first section of operations is to be accelerated and brought to completion during the Third Five-Year Plan period. Thus, the antiquated Mariinsk system will give way to a new powerful Volga-Baltic waterway.

The Second Five-Year Plan also provides for the appropriation of funds for the reconstruction of the Moscow river system. When reconstructed this system will connect Moscow and Gorky by water and as a continuation of the Volga-Moscow Canal it will considerably improve the transportation facilities of the city of Moscow and provide for the development of Moscow port. In addition, the Second Five-Year Plan period is to witness two great feats of hydro-technical engineering presenting problems the solution of which tsarist Russia had repeatedly attempted in vain—the establishment of a navigable through-route along the Dnieper and of a junction between the Volga and the Don.

The problem of making the Dnieper navigable throughout was solved already during the first year of the Second Five-Year Plan period. Through-shipping along the entire Dnieper became a fact in 1933 incident to the erection of the Lenin regional electric station on the Dnieper. When the first navigation season of the Second Five-Year Plan period opened, White Russia, Kiev and Dniepropetrovsk were directly connected with the Black Sea through the 97 km. of artificial waterway between Dniepropetrovsk and Zaporozhye.

The Second Five-Year Plan contemplates the construction of the Volga-Don Canal, 100 km. in length. The previously hemmed-in inner Volga Basin is being given an outlet to the open Black Sea, and cargoes of oil, coal, grain, timber, building materials, metals and other freight will pass through this canal.

At the same time great progress is being made in the reconstruction of the Volga system which will permit large vessels to ply this river. The Yaroslavl, Gorky and Perm dams are the first to be built and will create a veritable revolution in inland shipping.

The locks on the Sozh, which render 178 km. of this river navigable and are of great importance for the economic life of the White Russian Socialist Soviet Republic, are scheduled to be completed in 1935.

The realization of the huge program of hydro-technical construction will bring about a complete change in the Soviet Union's waterway transportation. The northern, north-western and southern districts of the U.S.S.R. will be interlinked by a continuous system of navigable waterways, and direct interior connection will be established between the northern and southern seas through a system of waterways. The Volga Basin provides the country with outlets to four seas—the Baltic, the White, the Black and the Caspian. It is but natural that all this should lend powerful impetus to the development of the productive forces of the U.S.S.R. and should reinforce its defensive strength.

This however does not exhaust the significance of the planned hydro-technical construction. All hydro-technical improvements are planned with a view to utilizing the artificial waterways not only for navigation purposes but also for the production of water power, for irrigation, water supply and fisheries.

The Soviet Union is richer in inland waterways than any other country in the world. According to the incomplete returns of a survey of water resources, the total length of interior water courses of the U.S.S.R. is about 420,000 km., 110,000 km. of which are navigable and 210,000 km. suitable for floats.

In order that the vast water resources of the Soviet Union may be still more intensively utilized and developed in the future, research and exploratory work is to be conducted along these lines during the Second Five-Year Plan period. In particular, this work is to aid in the solution of involved problems like the Kama-Pechora, Manychi and Dnieper Rivers as well as the transportation problems of the Upper Volga, the Kama Basin, the Northern Basin and the basins of the southern, Siberian and Far Eastern rivers, of the Pacific coast and the Arctic seas.

It is also planned to establish new sea lines during the Second Five-Year Plan period, both to interconnect Soviet ports and extend international routes. The Baltic Sea and Near East lines are being

strengthened and regular communication by sea is to be set up in the Far East.

During the Second Five-Year Plan period the Northern Sea Route is becoming a regular traffic lane, linking up the Soviet Extreme North with the Far East. The established communication with northern ports, Arctic islands, peninsulas and the ports at the mouths of the Asiatic rivers of the U.S.S.R. (the Ob, Yenisei, Lena and Kolyma) is of exceptional importance, as it is responsible for drawing the Extreme North with its inexhaustible natural wealth into still more active participation in socialist construction.

The Polar expeditions undertaken during the first years of the Second Five-Year Plan period represent a big step forward toward the solution of this difficult and complex problem.

The Second Five-Year Plan devotes particular attention to that most important factor of waterway shipping in the U.S.S.R., the mercantile fleet, which is a decisive factor in the reconstruction of transportation by water.

To meet the considerable increase in freight shipments, the river steamship and Diesel boat fleet (exclusive of cutters) is increasing during the course of the Second Five-Year Plan period from 510,000 i.h.p. to 760,000 i.h.p. (by 49 per cent), while the carrying capacity of the non-powered fleet is rising from 5,238,000 tons to 7,750,000 tons (by 43 per cent). The average power of the steam and Diesel ships (exclusive of cutters) is increasing from 268 i.h.p. in 1932 to 310 i.h.p. in 1937.

The fleet is being renewed as a whole at an appreciable rate, so that the average age is being reduced from 28-30 years in 1932 to 15-17 years.

The substantial renewal of the river fleet during the Second Five-Year Plan period is proceeding on the basis of mastering the latest technique and of introducing the most modern types of vessels. In the self-propelled fleet, the proportion of Diesel-powered ships is to be increased and a start is to be made in the use of electric motor-driven ships.

The sea-going fleet of the U.S.S.R. is to have its carrying capacity increased from 777,000 tons to 1,353,000 tons (by 74.0 per cent) which will permit all large and small cabotage, import shipments and a considerable part of the export shipments to be carried in Soviet bottoms.

Marine boilers and their utilization are to be considerably improved under the Second Five-Year Plan. At the beginning of the

Second Five-Year Plan period, only 8 per cent of these boilers were less than 12 years old, 51.2 per cent were more than 24 years old while 30.2 per cent had passed the 30 year mark. This accounted for the fact that the average steam pressure throughout the entire fleet at the beginning of the Second Five-Year Plan period was only 9 atmospheres instead of the 12 to 14 atmospheres required, which resulted in a considerable deficiency in the utilization of the capacity of the machinery, a waste of fuel and a reduction in the speed of vessels. The marine boiler construction planned for the Second Five-Year Plan period is lowering the average age of boilers from 23-24 years (the 1932 figures) to 11-12 years in 1937.

It is likewise contemplated to effect considerable qualitative improvements in shipbuilding. Standardization, specialization and typification of both the transportation and the technical service river and sea-going fleets are to be introduced with a maximum reduction in the types of vessels. The construction of the hulls is to be improved and the main and auxiliary machinery are to be perfected and their weight and fuel consumption sharply reduced. The latest types of internal combustion engines, improved steam engines and power installations are being used to equip the new ships. Cutter construction will also be greatly developed. A new fleet of cutters aggregating 85,000 h.p. is to be put into operation.

During the Second Five-Year Plan period, refrigerator boats, ice-breakers, hydro-glisseurs, port tug boats and dredges are to be built in Soviet wharves. Among other items, 95 dredges, of which the country stands in great need, are to be built during the years of the Second Five-Year Plan period.

Of great importance for the development of river and sea transportation is the construction of a technical service and auxiliary fleet which is making it possible to improve the utilization of the present tonnage, to unload foreign vessels more rapidly and give them better service.

Electricity is to be extensively introduced in all the main branches of waterway transportation. It is planned to build Diesel-electric ships. Such electric-powered ships are to be introduced first on the Crimea-Caucasus express line. The new ice-breakers and port tug boats being built will be equipped with electric transmission. In addition it is planned to equip vessels on an extensive scale with electric apparatus (for lighting, signalling and communication), to electrify auxiliary machinery (steering gear,

anchor handling, capstans, etc.) and to provide the vessels with electric navigation instruments.

The Second Five-Year Plan also provides for extensive dock and wharf construction. At the beginning of this period it was possible to drydock boats only once every two years in the Soviet Union while in advanced capitalist countries they are drydocked once every 6 to 12 months. The Plan provides for the construction of assembly docks and wharves, primarily in the Pacific Coast basin.

The Plan also specifies that the sea-ports of Pechora, Soroka, Murmansk, Kherson, Baku, Ochemchiri, Vladivostok, etc., and the river-ports of Gorky, Kazan, Stalingrad, Astrakhan, Perm, Kiev, Homel, Leningrad, Novosibirsk, Omsk, etc., construction of which was begun during the First Five-Year Plan period or which represent new construction jobs, be further developed and that their area be extended and provided with the necessary equipment.

The port construction plans contemplate an increase in the capacity of piers, the mechanization of transshipping operations, the development of warehousing, the specialization of ports, thereby improving the conditions under which vessels are being exploited, sharply reducing their stop-over time, promoting cargo safety, improving working conditions and high-grade passenger service.

The Plan also provides for the reconstruction and re-equipment of the most important ship repair bases, wintering and repair docks and shipyards of the People's Commissariat of Water Transportation to meet the growing demands made upon transportation by water. The most modern production processes, particularly electric welding, are to be extensively introduced.

The principal shipyards and workshops of the People's Commissariat of Waterway Transportation which are intended for shipbuilding—the Diesel Boat Plant, the Astrakhan and Rybinsk Slips, the Ust-Izhora Shipyard, the ship repair bases in Archangel, Kherson, Vladivostok, Murmansk, Odessa, the Volga River repair docks, etc.—are to be adapted to intensified repair work and ship assembly as well as the manufacture of spare parts and the simpler mechanisms.

The plan for the mechanization of waterway transportation was drawn up with a view to strengthening to a considerable extent the weakest branch of this industry—the handling of cargoes. In addition to increasing the production capacity of machinery at

sea-ports by 48 per cent and at river-ports by 118 per cent, the Plan provides for a considerable improvement in utilization of loading and unloading apparatus so that as a result the proportion of mechanically handled freight is growing more rapidly than the aggregate capacity of the apparatus. At ports all transshipment equipment except floating equipment will be operated electrically. The more powerful installations—mechanical loading and unloading devices—are to be concentrated at major points where there is the greatest congestion of vessels and cargo and at transfer points.

Simultaneously with the mechanization of freight handling, other laborious processes, particularly construction and hydrotechnical work, are likewise to be mechanized.

The Plan provides for the further development of telephone, telegraph and radio communication at all important basins sufficient in extent to permit of despatcher management of fleet movements and shore operations.

All sea-going vessels and the larger river-boats, especially those in the remote basins, will have their own radio stations. Radio stations are also to be established at all maritime and the more important river-ports of the U.S.S.R. The total number of shore radio transmission stations is increasing from 207 to 392, and of ship stations—from 614 to 1,134.

The Plan specifies that steady cadres be attached to the waterway transportation service and that seasonal work in this service be abolished.

The Plan appropriates 278,000,000 rubles to be invested in the waterway transportation service for construction intended for housing, cultural and social purposes. This brings about a considerable increase in available housing space and will be instrumental in overcoming the great labour turnover among waterway transportation workers.

In view of the intensive growth of the economic life of the national republics which in most instances rely upon waterways as the main means and often the sole means of communication, the Plan devotes particular attention to the development of waterways in new districts.

The share of investments made in waterway transportation in Siberian and Far Eastern basins is growing from 13.7 per cent to 26.6 per cent of the total for the Five-Year Plan period; the fleet of these basins, investments in construction for housing and

office buildings, warehouses, ship repair bases, communication, etc., exhibit similar proportional increases.

The reconstruction of waterway transportation necessitates radical changes in the methods by which the fleet and shore facilities are being exploited.

The decree of the Central Executive Committee and the Council of People's Commissars of the U.S.S.R. dated March 15, 1934, "concerning the reorganization of the managing bodies of waterway transportation," and the decision of the Council of People's Commissars of the U.S.S.R. and the Central Committee of the Communist Party of the Soviet Union dated May 5, 1934 "concerning the planning of shipments and improving the work of the waterway transportation service" present a concrete and broadly-conceived program of reorganization.

The indices of exploitation (the number of ton-kilometres per unit of capacity of the fleet) are to exhibit increases commensurate with the growth of the material and technical base of waterway transportation, with the greater mastery of this service and its better supply of cadres. Thus, the indices for the river steamships and Diesel-powered boats will show the following increases in comparison with 1932: oil cargoes carried—33 per cent, dry cargoes—83 per cent, and rafted cargo—23 per cent; for propelled oil tankers—30 per cent and dry cargo—128 per cent. In maritime transportation the above indices rise as follows: for dry cargo on exterior seas—59.4 per cent, on the Caspian Sea—103 per cent, oil tanker tonnage on exterior seas—57.5 per cent, on the Caspian Sea—43 per cent.

The rapid rates of growth of waterway transportation in the U.S.S.R. during the Second Five-Year Plan period considerably enhance the role of this service in the national economy of the country.

MOTOR TRANSPORTATION

PURSUANT to the directives of the Seventeenth Congress of the Communist Party of the Soviet Union and of the Government, the Second Five-Year Plan specifies a more rapid growth of motor haulage and road and highway construction than in other fields of transportation. By the end of 1937, the output capacity of automoble plants is to increase to 360,000 motor vehicles as compared with 92,000 at the beginning of the second five-year period. During this period the Molotov Automobile Plant at Gorky is being enlarged to a capacity of 300,000 vehicles; the Stalin Automobile Plant at Moscow—to a capacity of 80,000 vehicles (70,000 trucks and 10,000 passenger cars with large piston displacement); the automobile plant under construction at Yaroslavl is to produce 25,000 5-ton and heavier trucks. In addition, construction will commence on two new automobile plants with a capacity of 100,000 3-ton trucks each, and one plant which is to produce 25,000 5-ton and heavier trucks.

The Soviet automobile plants will produce in the main 3 standard types of trucks and busses—model GAZ ("Ford AA") manufactured by the Gorky Automobile Plant—1.5-ton, model ZIS 3-5 manufactured by the Stalin Automobile Plant in Moscow—3-ton and model "YG-5" manufactured by the Yaroslavl Truck Plant—5-ton, as well as two standard types of passenger cars of model GAZ and large piston displacement cars. In addition to this it is planned to produce 3-axle truck sub-types, traction automobiles, trailers, etc. Altogether the automobile industry is to produce during the Second Five-Year Plan period 571,500 motor vehicles including 146,200 passenger cars, 35,000 busses, 23,000 municipal service cars and fire engines and 367,300 trucks. The 1937 production schedule calls for 200,000 motor vehicles, this number being composed of 60,000 passenger cars, 16,500 busses, 10,500 municipal service cars and 113,000 trucks.

By the end of the Second Five-Year Plan period, the total number of motor vehicles will rise to 580,000 as against 75,400 in 1932, a 7.7-fold increase. The number of passenger cars will be 147,000.

of busses—35,000, municipal service cars and fire engines—25,000, and trucks—373,000.

This rapid increase in the number of motor vehicles ensures a considerable increase in freight traffic which is to total 16,000,000,000 ton-km. in 1937 as against 1,070,000,000 ton-km. in 1932. The following standards of work applying to trucks have been laid at the basis of this freight traffic plan: 75 per cent of all registered trucks are to work daily[1]; the average daily run is to be 140 km., including 90 km. loaded; the average load of trucks is to be 95 per cent of capacity.

In 1932, the annual average run per motor vehicle under the All-Union Automobile Transportation Association was about 22,000 km. while the Plan for 1937 contemplates a rise in this figure to about 37,000 km. on the average for the country's automobile fleet. On the other hand selected statistical data concerning the annual run of trucks in the capitalist countries in 1931-32 show the following:

Great Britain	26,000 km.
U.S.A.	14,500 "
Germany[2]	13,000 "

During the Second Five-Year Plan period, public automobile transportation will acquire great importance, particularly the service offered by the All-Union Automobile Transportation Association, the automobile trusts of the various republics and regions, as well as municipal automobile transportation service. It is the main function of public automobile transportation service to relieve the railroad terminals and to haul freight to and from railroad points for short distances. By the end of the Second Five-Year Plan period, the number of motor vehicles controlled by the All-Union Automobile Transportation Association will be increased to 15,000, and will comprise more than 12,000 trucks having an aggregate carrying capacity of 55,000 tons and 1,500 busses with a total seating capacity of over 35,000. It is planned to invest the sum of 240,000,000 rubles in the All-Union Transportation Association during the Second Five-Year Plan period.

The number of motor vehicles under the control of the automobile transportation trusts at the end of the Second Five-Year

[1] In 1932 only 48 per cent of the trucks operating under the All-Union Automobile Transportation Association worked daily.

[2] For certain motor transportation establishments.

Plan period is to rise to 15,000 units with a total carrying capacity of 45,000 tons while fixing capital investments in these trusts at 200,000,000 rubles.

The increase in the number of motor vehicles and the greater efficiency with which they are exploited make it necessary to set up during the Second Five-Year Plan period a powerful technical base for the manufacture of spare parts and to organize automobile repairing in all branches of national economy.

Automobile repair work is to be based in the main on the principle of changing assemblies at repair stations and of subsequently repairing the removed assemblies at special plants. To this end it is planned to build 24 new repair plants within the system of the All-Union Automobile Supply and Repair Association, to complete the construction of and enlarge 9 existing repair plants which were begun during the First Five-Year Plan period and to build 162 new automobile repair stations, 66 vulcanizing shops and 1,000 filling stations. The sum of 600,000,000 rubles is to be appropriated for these purposes.

The planned network of automobile repair plants will suffice to completely overhaul, in 1937, 40 per cent of all motor vehicles in operation in the U.S.S.R. on the basis of working two shifts. Various departments and enterprises likewise contemplate making considerable investments for the repair of motor vehicles.

The increase in the number of motor vehicles makes it necessary to extend road building. The Second Five-Year Plan makes provision for the building or reconstruction of 210,000 km. of roadway, including 30,000 km. of stone-covered roads (in comparison with 12,000 km. built during the First Five-Year Plan period).

Thus, the bulk of roadways during the Second Five-Year Plan period will consist of low cost improved dirt roads. This makes it possible to build a ramified system of roads for automobile and horse-drawn traffic in a short period of time at a minimum of first cost and to terminate in the main the lack of roads, subsequently reconstructing the dirt roads gradually into higher grade roads to meet the increase in traffic.

Much attention is being paid during the Second Five-Year Plan period to the building of roads leading to railroad terminals, harbours and centres of population. In addition to the completion of a number of through-roadways (Angara-Lena, Tunkinsk, Chu, Usinsk, Ferghana, Ayaguz-Bakhty, Frunze-Turugart, Sary Uzek-

Khorgos, Tashkent-Stalinabad, Osh-Pamir-Khorog), it is planned to build at the same time a number of main highways by reconstructing present roads and building new ones. The following roads are here included: Moscow-Leningrad, Moscow-Sebezh, Moscow-Minsk, Moscow-Gorky-Sverdlovsk-Kurgan, Khabarovsk-Vladivostok (as part of the trunk highway Moscow-Vladivostok), Moscow-Kharkov-Rostov-Orjonikidze-Tiflis, Leningrad-Kiev-Odessa, Kharkov-Kiev and Kharkov-Sebastopol. Capital investments in road building and maintenance during the years of the Second Five-Year Plan period have been set at 2,960,000,000 rubles, of which 1,960,000,000 rubles are to be allotted to the reconstruction of old and the construction of new roads. Thus, appropriations for road building are tripling in comparison with the First Five-Year Plan period. The labour contributed by the population which is valued at 1,700,000,000 rubles for the Five-Year Plan period is to play an important role in local road construction.

Mechanization of road building for which 300,000,000 rubles have been assigned for the five years is the decisive factor in carrying out the program outlined.

Inasmuch as the Plan attaches great importance to the exploitation of the present roads and the new roads opened to traffic, it is contemplated to expend 428,000,000 rubles for major road repairs and 1,400,000,000 rubles for road maintenance.

CIVIL AVIATION

DURING the First Five-Year Plan period civil aircraft construction in the Soviet Union was developed on a large scale and set up its own base for the still more rapid development of the civil air fleet during the second quinquennium.

In accordance with the aforesaid and with the directions issued by the Seventeenth Congress of the Communist Party concerning the development of aerial communication to cover all the principle routes, the airline network under all-Union control must grow to 85,000 km. during the Second Five-Year Plan period (exclusive of Deruluft—German-Russian Airline Company) as against 31,934 km. in 1932, *i.e.*, an almost 3-fold increase. Besides, the construction of local airlines will be extensively developed for the first time during the Second Five-Year Plan period, being scheduled to reach a total length of 35,000 km. by the end of this period.

The principal airlines (Moscow-Sverdlovsk-Novosibirsk-Irkutsk-Khabarovsk-Vladivostok, Leningrad-Moscow-Kharkov-Rostov-Tiflis-Baku, Moscow-Samara-Orenburg-Tashkent) were established in the main during the First Five-Year Plan period so that to the Second Five-Year Plan period has fallen the task of completing the equipment of these main lines for day and night flying service, of mastering them and of developing their utilization to the fullest extent. The following are the most important new aerial trunk lines included in the construction plan of the second five-year period: Leningrad-Kiev-Odessa, Baku-Krassnovodsk-Ashkhabad-Tashkent-Alma Ata, Semipalatinsk-Novosibirsk, Moscow-Kazan-Ufa-Magnitnaya-Karaganda—and by hydroplane along the Lena, the Yenisei, the Far Eastern coast, the Black Sea coast (Odessa-Batum) and other lines.

The huge volume of reconstruction in civil aviation ensures a great increase in the carrying capacity of the airway transportation fleet and greatly improves its structure owing to the introduction of multi-motored planes, as well as high speed, single and multi-motored postal service planes, specialized industrial and freight-carrying aircraft, also hydroplanes and dirigibles.

It is planned to continue the development of dirigible construction and to open the first experimental lines to traffic served by dirigibles.

Under the civil aviation construction plan increasing rates of development are assured for every field of operation in which civil aviation is engaged. This is being achieved by mastering the material and technical base which was established during the First, and is being enlarged during the Second Five-Year Plan period.

The volume of aerial transportation is multiplying many times: passenger traffic is increasing to 665,000 persons in 1937, *i.e.*, 24.6 times, postal shipments—to 68,500 tons or 159.4 times, freight—to 26,500 tons or 59.3 times, attaining a total of 120,000,000 ton-km. There is also to be a notable expansion of agricultural, forestry and aerial-photographic aviation. It is planned to form a special group of aircraft, principally light-motored, for use by various government departments and social organizations.

The sum of 1,500,000,000 rubles has been appropriated for capital investments in civil aviation during the Second Five-Year Plan period, as against 264,000,000 rubles during the First Five-Year Plan period, *i.e.*, a more than 5-fold increase.

It is further contemplated to set up such a system of land equipment and of repair work facilities as will make it possible to use aeroplanes over the principal air routes day and night throughout the entire year.

The endeavour to reduce the cost of air transportation during the Second Five-Year Plan period is an essential factor in the development of civil aviation. The Plan stipulates that costs per ton-km. of freight transported must be lowered 70 per cent.

During the Second Five-Year Plan period Soviet civil aviation will advance to one of the foremost places in the world; it will be a first-class means of rapid long-distance transportation.

Mastery of the technique of airway communication, completion of reconstruction of airlines, particularly the introduction of the most perfected aeroplanes parallel with a considerable rise in the technical and economic indices of the work of the air fleet, constitute the principal tasks of the airway transportation service during the Second Five-Year Plan period.

COMMUNICATION

IN accordance with the directions issued by the Seventeenth Congress of the Communist Party and by the Government, the plan for the second five-year period contemplates a decided and universal improvement in the quality of work of all forms of communication, a radical reconstruction of the communication service and an extensive development of all its forms, particularly of radio communication.

The total output by the various communication services is to increase from 9,800,000,000 statistical units in 1932 to 20,500,000,000 units in 1937, *i.e.*, a more than 2-fold increase. According to the Plan, outgoing letter correspondence is to reach a total of 3,000,000,000 units as compared with 1,505,000,000 units at the beginning of the Second Five-Year Plan period; the number of periodicals mailed is increasing from 4,694,000,000 to 9,000,000,000; of telegrams—from 76,000,000 to 140,000,000; the number of long-distance telephone calls—from 24,000,000 to 85,000,000 and the number of urban telephone subscribers—from 415,600 in 1932 to 820,000 in 1937.

The great demand existing in the country for high-quality communication service must be satisfied not only by increasing communication facilities but also by better utilization of the present equipment and apparatus, especially the communication lines, by decidedly improving the organization of labour and the qualifications of the workers, by extending the introduction of and perfecting cost accounting and by persistently carrying out rationalization and reconstruction measures. The reconstruction of the communication service must assure the realization of a unified, all-inclusive socialist system of communication in which the individual components mutually and rationally supplement each other.

The Plan specifies that direct telephonic and telegraphic communication is to be established between Moscow and all important centres of republics, territories and regions and the most important enterprises and building operations under all-Union control by

new construction and the reconstruction of the existing telephone and telegraph lines and by the combined utilization of wire and wireless communication. It is planned to connect all republics by telegraph and telephone with all their constituent regions and the regions with their district centres. By the end of the Second Five-Year Plan period the organization of 2-way telephone communication between the centres of the republics, territories and regions and their respective districts and the political departments of their respective machine and tractor stations and State farms is to be completed so as to set up telephone communications between them and organize teleconferences. A shift from the radial system of communication to the junction system has been mapped out. The total length of long-distance telephone and telegraph lines as well as local telephone lines must rise from 1,515,000 km. in 1932 to 3,830,000 km. in 1937. The length of the bronze and bi-metallic wires is increasing from 70,000 km. to 230,000 km., which can be taken as one of the indices of the volume of communication reconstruction.

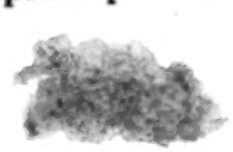
In order that telephonic communication between Moscow and the centres of republics, territories and regions may be better organized, it is planned to install bronze and bi-metallic circuits on the following lines: Saratov-Stalingrad, Orenburg-Tashkent, Frunze-Lugovaya, Tashkent-Alma Ata, Tashkent-Charjui-Krasnovodsk, Tashkent-Stalinabad, Moscow-Chelyabinsk-Omsk-Novosibirsk-Irkutsk-Khabarovsk, Petropavlovsk-Karaganda-Chu-Alma Ata, Gorky-Kazan, Leningrad-Murmansk, Novosibirsk-Alma Ata, Moscow-Bryansk-Kiev, Kharkov-Kiev, Ivanovo-Gorky and other lines. It is also contemplated to shift to cable operation of the Moscow-Kharkov-Donetz Basin and the Moscow-Minsk main lines.

The total volume of capital investments in the telegraph and telephone trunk lines for the five years has been fixed at 427,000,000 rubles.

The construction of radio telephone and telegraph trunk lines must be particularly developed. It has been planned to increase the number of main line radio transmitters from 73 in 1932 to 294 in 1937, while their capacity is to increase from 933 kw. to 3,411 kw.

The policy pursued will be to build huge radio centres and powerful radio main lines using short wave-lengths in the main.

It is planned to equip the big radio centres with automatic receivers and transmitters and with high-speed telegraphic typing apparatus. All the principal radio main lines will serve for tele-



graphic as well as telephonic communication, with the adoption of multiplex telephony and telegraphy on these lines.

During the entire five years, 151,000,000 rubles will be invested in radio telephone and telegraph service.

The Second Five-Year Plan likewise contemplates the following reconstruction measures in the field of interurban telephonic and telegraphic communication:

a) Re-equipment of the present and building of new big, medium and small telephone and telegraph exchanges, including the installation of repeater and control stations;

b) Introduction of improved high-speed telegraphic apparatus with standard typewriter keyboard on the wire and radio trunk lines. The number of Baudot multiplex telegraph instruments in operation is increasing from 1,176 in 1932 to 2,390 in 1937, and of the Treml and Shorin instruments—from 9 to 4,500;

c) Introduction of television and phototelegraphy increasing the size of images to that of a full newspaper page;

d) Equipment of bronze and bi-metallic circuits with apparatus that will make possible simultaneous multiplex telegraph and telephone transmission over a single line of ten 2-way connections, while accelerating the mastering of systems which still further increase the number of connections;

e) Maximum utilization of the iron telephone and telegraph circuits by adding frequencies, applying the Picard system, forming phantom circuits and reconstructing the line arrangement of communication by shifting to traverses and the like.

Development of local communication service in the countryside to a degree that will provide telephonic communication between district centres and all their respective State farms and machine and tractor stations, and an increase in the proportion of rural Soviets supplied with telephone service from 38.8 per cent in 1932 to 100 per cent in 1937 are provided for in the Plan. At the same time 40 per cent of the machine and tractor stations and State farms under the control of all-Union associations are to be equipped with intra-establishment telephone service. In accordance with this plan, the telephones available for rural local service are increasing from 44,000 to 254,400.

On the larger State farms and machine and tractor stations, ultra short-wave radio stations (5,500) are being installed, which make it possible to institute telephonic communication with the several brigades working in the fields.

During the five years, 290,000,000 rubles are being invested in rural local wire telephone service.

While the Plan specifies that the number of dial telephone exchanges in the cities is to be greatly increased as these are the technically most perfected and at the same time the most economical installations, there is also to be an increase in the number of telephones to be supplied to urban residents.

According to the Plan there will be 1.8 telephones per 100 city dwellers instead of the 1.1 telephones at the beginning of the Second Five-Year Plan period. This involves an increase in the total number of telephones installed in cities, the number of lines rising from 492,600 in 1932 to 970,000 in 1937. Of these, 500,000 subscribers' lines will be dial system, as compared with 77,600 such lines at the beginning of the Second Five-Year Plan period.

In order that this program of telephone construction may be fulfilled, it is planned to increase the utilization of the line equipment by using 2-wire connecting lines between district stations instead of 3-wire lines, by installing additional telephones and putting two subscribers on one line.

The sum of 240,000,000 rubles has been appropriated for investment in the urban telephone service during the five years in order to meet the specifications of the Plan.

In the realm of radio broadcasting it is planned to complete in the main the task of covering the whole territory of the Soviet Union with a network of broadcasting stations. To this end the following stations are to be built: two 100-kw. stations, one 35-kw. station, four 25-kw. stations, twenty 10-kw. stations, one short-wave station of 60 kw. and a number of stations of small capacity. The number of broadcasting stations is increasing during the Five-Year Plan period from 57 to 88 and their total capacity—from 1,503 kw. to 2,194 kw., requiring a capital investment of 27,000,000 rubles inclusive of reconstruction measures.

The realization of this radio construction program will make possible simultaneous relays throughout the Soviet Union of broadcasts from the large Soviet stations, and will permit the national republics and the autonomous regions to broadcast in their own national languages.

The Plan devotes special attention to spreading the use of the radio throughout the Soviet Union. By the end of the Second Five-Year Plan period, 8,000,000 radio sets are to be in use.

Two- and three-tube receivers equipped with special radio-

frequency tubes are to be the main types for mass consumption, while electrodynamic and improved electromagnetic loudspeakers are to be the principal types in use.

In the postal service it is planned to provide the whole population of the Soviet Union with regular postal service, the scheme of which is to be improved in both town and country. Capital investments in the postal service are to total 156,000,000 rubles for the Second Five-Year Plan period.

Capital investments in all forms of national communication (exclusive of receiving sets and their installation, and of Government departmental communication) total 1,700,000,000 rubles for the five-year period, which compares with 565,000,000 rubles during the First Five-Year Plan period.

For the purpose of increasing the carrying capacity of the various railroad sections, of making better use of the rolling stock, of increasing the speed of, and ensuring greater safety for, trains, the Plan stresses the development of the signal system, and provides for the increased use of the following forms of communication on the present trunk line railroads as well as the organization of these forms of communication on the projected new trunk lines: dispatcher lines, station communication lines, switch control lines, station-dispatcher, line and route, and local and trunk-line wire communication. The development of all these forms of communication must be linked up with the railroad trunk line construction plan. The telephone is becoming the principal means of communication in railroading, the telegraph occupying an auxiliary position.

The total length of railroad telephone lines is increasing from 161,300 km. in 1932 to 280,000 km. in 1937, bronze and bi-metallic lines increasing in total length from 10,000 km. to 36,000 km. The capacity of telephone exchanges is growing from 89,000 lines to 141,000 lines. The length of railroad lines equipped with automatic block signals is increasing from 582 km. to 8,882 km., of those equipped with semi-automatic block signals—from 13,400 km. to 20,000 km. The number of centralized electric control switches is rising from 1,400 to 6,400. Capital investments in the railroad signalling and communication service total 400,000,000 for the five years.

In waterway transportation it is planned to institute the following forms of communication on the principal trunk lines in the European part of the Soviet Union: dispatcher lines, pier, intra-

district, lock and long-distance telephone and telegraph lines (connecting river basin managements with their respective districts); also local telephone communication at narrow sections of rivers. It has besides been planned to equip big loading and unloading points and large vessels with radio. Communication in some form or other will be installed on the other main waterways and smaller rivers of the European part of the U.S.S.R., dependent upon whichever system may prove most economical and efficient.

For the basins of the Asiatic portion of the Soviet Union, radio communication is to be set up between shore points and on board the large, self-propelled vessels so that they may be able to communicate among themselves and with points on shore. The Plan provides in addition for wire communication on sectors where traffic is particularly heavy.

The Second Five-Year Plan provides for the erection of shore radio stations at the chief ports of seas and lakes as well as on shipboard.

The total length of telephone lines in the waterway transportation system is increasing from 21,400 km. in 1932 to 66,400 km. in 1937. The number of radio transmission stations is increasing from 821 to 1,526. Capital investments in the communication services for waterway transportation amount to 57,000,000 rubles during the second five-year period.

In civil aviation, it is contemplated to reinforce the communication service to an extent that will guarantee the prompt receipt of meteorological information necessary to guide the movement of aeroplanes, establish uninterrupted communication and contact between dirigibles and aeroplanes, and the earth; also to introduce radio piloting. Total capital investments in the communication service for the civil air fleet amount to 44,000,000 rubles for five years.

The carrying out of the measures provided for in the Second Five-Year Plan in conjunction with the improvement in the mastery of the existing communication facilities and of those under construction must conduce to a radical qualitative improvement in all forms of communication. At the same time a technical base is being set up during the Second Five-Year Plan period which will determine the new lines to be followed in the development of the communication services, *viz.*, the further equipping of the present trunk lines for multiplex telephone and telegraph service instead of stringing a great number of new wires, and the trans-

forming of the local communication system into a dense network of telephone and telegraph lines. In the end the whole telephone and telegraph network will change from a radial system with its great number of relays to a junction system where the bulk of the messages will travel along direct channels.

CONSTRUCTION PROGRAM AND GEOGRAPHIC DISTRIBUTION OF THE FORCES OF PRODUCTION

I

THE Second Five-Year Plan of construction is governed by the task of completing the technical reconstruction of national economy. Using as its foundation the reconstruction base already created—heavy industry—and to a great extent widening and consolidating this base, the Plan maps out a vast program for the technical re-equipment of all branches of national economy.

The further development of the machinery industry is the decisive factor in this reconstruction. While specifying that the machinery production base of the U.S.S.R. must undergo extensive development, the construction plan likewise makes provision for the necessary expansion of construction for the metallurgical, fuel, power and chemical industries—all the various branches of heavy industry without the development of which it is inconceivable that national economy be technically reconstructed and that the machinery industry itself be the decisive factor in this reconstruction.

During the Second Five-Year Plan period there must be realized a huge program calling for the opening for exploitation of a great number of new enterprises and for extensive reconstruction operations in the various branches of heavy industry, which will considerably augment the production capacity of the leading branches of national economy. The significance which attaches during the Second Five-Year Plan period to the construction program of heavy industry—the foundation of the country's industrialization and of the completion of its technical reconstruction—is therefore quite obvious.

The new geographic distribution of productive forces which will ensure a more even allocation of industry in the U.S.S.R. and will bring industry in closer proximity to the sources of raw materials and power, the specialization of the principal districts in specific crops or branches of agriculture, the overcoming of the economic and cultural backwardness of the national republics and regions and the great progress in the direction of eliminating the contrast between town and country constitute the second principal objective of the construction plan for the second five-year period, an objective inseparably connected with the solution of the

problem of completing technical reconstruction in national economy.

Major successes were accomplished even under the First Five-Year Plan in this new geographic distribution of productive forces upon which the most efficient utilization of the Soviet Union's natural wealth depends. The creation of a second coal and iron base in the East—the Ural-Kuznetzk Combination—and the great strides made in the industrial development of the national districts are achievements the importance of which cannot be overestimated.

Continuing the shifts in the geographic distribution of the forces of production which have taken definite shape as a result of construction under the First Five-Year Plan, the second quinquennial period, by the very scale on which construction has been projected for it, is a period of historic importance, inasmuch as it determines the territorial distribution of the principal economic centres and is completing the economic regionalization of the U.S.S.R.

The third highly important task set by the construction plan is the vast development of building operations designed to raise the material and cultural level of the toilers. This policy is reflected in the great volume of construction for light industry and the food industry, in the sharp absolute and relative increase in the amounts invested in all kinds of construction for cultural and social purposes.

Grounded upon the successes scored in the establishment of a domestic heavy industry base, the last years of the First Five-Year Plan period already developed great momentum in building up light industry and the food industry, and a vast program of construction for cultural and social purposes was brought to fruition. So much the greater are the possibilities and the tasks which in this respect confront the Second Five-Year Plan period.

The extensive housing and municipal construction program embodied in the Plan, embracing as it does all departments of the country's economic life, is absolutely essential to create the social conditions necessary for the new industrial centres which are springing up and thus constitutes one of the most important factors in mastering the technique of the new enterprises.

The newly founded industrial centres, which gave rise to an immensely increased demand for industrial and agricultural freight transportation, and the consolidation of the economic ties between

town and country make it imperative greatly to expand construction for transportation facilities.

Construction for transportation purposes is therefore one of the principal nodal points of the Second Five-Year Plan. While establishing a powerful network of reconstructed railroad trunk lines and laying new lines, thus drawing new sources of the country's natural wealth into the orbit of industrial exploitation, the Plan provides at the same time for large-scale construction work for waterway transportation and motor haulage which ensures a higher rate of construction for the transportation service than for other branches of national economy.

The construction for auxiliary and co-operating branches of industry provided for in the Plan—surrounding newly-built establishments with a whole complex of auxiliary and service stations and structures—enables the production equipment installed to be used to best advantage. This is particularly important for agriculture, in which field the most important task assigned by the Plan consists not only in more than doubling the number of machine and tractor stations but also in completing the construction and the technical equipping of the machine and tractor stations and State farms set up during the First Five-Year Plan period, as well as in further reinforcing the material base of socialist farming.

This entire complex of measures is designed to raise considerably the technical level of, and lend impetus to individual branches and sectors of national economy within the general plan of its technical reconstruction. The importance of this part of the Plan of construction is particularly great in the light of the necessity of assimilating the new fixed capital of national economy, inasmuch as these measures create the most favourable conditions for the most efficient utilization—both quantitative and qualitative—of the country's new technical equipment.

These were the main principles which determined the extent and the main lines of apportionment of the construction plan for the second quinquennial period.

II

The total volume of construction in national economy during the Second Five-Year Plan period has been set at 133,400,000,000

rubles, as against 50,500,000,000[1] rubles during the First Five-Year Plan period.

The very immensity of the investments provided for by the Plan proclaims the deep-going character and sweeping extent of the technical reconstruction assured under this Plan. Investments on such a scale reconstruct the entire production equipment of national economy, effect a complete change in its structure and greatly raise its production capacity.

The total volume of construction is distributed among the branches of national economy in conformity with the principal tasks assigned in the Plan as set forth above and as appears from the data adduced in the following table:

CONSTRUCTION, BY BRANCHES OF NATIONAL ECONOMY

(billion rubles)

Branches of national economy	First Five-Year Plan period (1928-29 to 1932)	Second Five-Year Plan period (1933—37)	Second Five-Year Plan period in % of First Five-Year Plan period
Industry	24.8	69.5	280.5
of which:			
Group "A"	21.3	53.4	251.0
Group "B"	3.5	16.1	460.5
Agriculture	9.7	15.2	157.3
of which:			
State farms	4.5	5.5	122.3
Machine and tractor stations	1.2	6.4	542.2
Transportation	8.9	26.3	294.9
of which:			
Railway transportation	6.4	17.4	271.4
Waterway transportation	1.2	4.3	363.0
Motor transportation	1.1	3.4	314.1
Miscellaneous branches	7.1	22.4	315.5
Total for the whole of national economy	50.5	133.4	264.1
of which:			
Construction for housing, communal, cultural and social purposes (inclusive of construction for training cadres)	10.3	32.5	314.9

[1] If investments in the form of means and labour contributed by the collective farms and collective farmers themselves and the labour contributed by the population in the building of roads are included, the total volume of construction under the First Five-Year Plan is 52,500,000,000 rubles, and for the Second Five-Year Plan period—140,100,000,000 rubles.

While increasing the volume of construction for heavy industry 2.5-fold in comparison with the First Five-Year Plan period and providing for a still greater increase in the volume of construction in light industry and the food industry (4.6-fold), the Plan assures forced rates of development in construction for transportation purposes and makes certain that the lag of this branch of national economy behind the general development of the latter will be eliminated. The Five-Year Plan likewise lays down a vast reconstruction program for agriculture, investments in which are to multiply 1.5 times in comparison with the First Five-Year Plan, with special emphasis on the extensive development of machine and tractor station construction.

Construction for housing, municipal, cultural and social purposes is increasing 3.1-fold, thus appreciably outstripping the rate of increase of capital investments in national economy as a whole.

The development of construction in individual branches of industry during the Second Five-Year Plan period is directly determined by the volume of output assigned, by the volume of uncompleted construction carried over from the First Five-Year Plan period, by the volume of reserve capacities projected and the extent to which preparations are being made for construction in the Third Five-Year Plan period. During the First Five-Year Plan period construction for heavy industry amounted to 21,300,000,000 rubles and new enterprises put into operation—to 13,200,000,000 rubles; at the beginning of the Second Five-Year Plan period the uncompleted construction amounted to more than 8,000,000,000 rubles, while the principal construction jobs in heavy industry represented a value of 28,000,000,000 rubles. These facts by themselves make plain the important role played by the carry-over in construction.

The extensive development of new construction is a general feature which characterizes the construction programs of all branches of industry. Thus, within the systems of the principal industrial People's Commissariats, the proportion which new construction formed of the total amount of capital invested during the First Five-Year Plan period was 42.4 per cent, rising to 58.9 per cent under the Second Five-Year Plan. Reconstruction of establishments in operation, which during the years of the First Five-Year Plan period constituted 29.8 per cent of total investments, recedes to 11.0 per cent. There is a proportionate increase in ex-

penditures, from 22.8 per cent to 25.2 per cent, for construction for housing, cultural and social purposes, and for construction necessitated by the rationalization of technological processes, *i.e.*, for all building operations incidental to mastering the technique of the new enterprises established during the years of the First and Second Five-Year Plan periods. Of the total of 64,700,000,000 rubles invested under the principal industrial People's Commissariats, 38,100,000,000 rubles have been allotted for new construction, 7,100,000,000 rubles for major reconstruction jobs on establishments in operation, 3,200,000,000 rubles for major repairs and 16,300,000,000 rubles for miscellaneous work on such establishments.

Large industrial combinations, equipped with the latest achievements of modern engineering ensuring the most rational utilization of raw materials and power, and interlinked on the basis of specialization and co-operation in production processes, represent the main type of new industrial construction.

The volume of new construction by individual branches of industry is set forth in the following table given in billion rubles:

Branches of industry	Total construction for the 5 years	Of which: new construction			Expenditures for new construction in % of total sum invested	New construction begun, in % of total sum invested in new construction
		Total	Of which:			
			Carried over from the First Five-Year Plan period	Begun during the Second Five-Year Plan period		
P.C. of Heavy Industry	46.76	28.36	14.85	13.51	60.6	47.7
of which:						
Coal industry	3.50	1.17	0.90	0.27	33.4	23.1
Iron and steel industry (exclusive of ore)	8.18	5.37	4.28	1.09	65.6	20.3
Machinery industry	8.06	5.63	2.69	2.94	62.1	52.2
Chemical industry	4.77	3.54	1.41	2.13	74.3	60.2
Electric power stations	5.35	3.69	1.50	2.19	69.0	62.0
P.C. of Light Industry	9.20	5.37	0.64	4.73	58.4	88.2
P.C. of Supply	5.34	2.82	1.22	1.60	52.8	56.8
P.C. of Timber	3.45	1.60	0.44	1.16	46.4	72.5
Total for the principal industrial People's Commissariats	64.75	38.15	17.15	21.00	58.9	55.1

Light industry, the timber industry, electric power generation and the chemical industry, whose construction carry-over from the First Five-Year Plan period was comparatively small and in which the fulfilment of the assigned rates of development of production is directly dependent upon the building of new enterprises, exhibit the greatest proportion of newly commenced construction in the total sum appropriated for new construction. The volume of newly commenced construction in the food industry is also quite considerable.

The vast dimensions of the enterprises being built and the long periods of time consequently required for their erection made it necessary to plan the construction of most of the new enterprises in several sections, which are to be successively put into operation and ensure the most rational solution of the problem of mastering capacity production of the enterprises under construction already during the course of the Second Five-Year Plan period. This is precisely the reason why in a number of instances lists of construction jobs under the Second Five-Year Plan do not fully account for the total cost of these jobs, in so far as second and third sections of these construction jobs are to be completed during the Third Five-Year Plan period.

The technical reconstruction of national economy and its shift to an electric power basis make imperative the vast development of electric power station construction, especially the erection of regional power stations. As against 1,900,000,000 rubles invested in the construction of regional stations during the First Five-Year Plan period it is planned to invest 5,350,000,000 rubles in such construction during the Second Five-Year Plan period, of which 1,500,000,000 rubles are being allocated to the completion and development of regional stations the construction of which was carried over from the First Five-Year Plan period, while 2,190,000,000 rubles have been appropriated for stations on which construction is to be commenced.

The aggregate capacity of all electric power stations in the U.S.S.R. was 4,690,000 kw. at the beginning of the Second Five-Year Plan period, of which 2,650,000 kw. were accounted for by regional stations. As a result of the construction planned for the second five-year period, the aggregate capacity of all electric power stations in the U.S.S.R. is rising to 10,900,000 kw., of which the regional stations account for 7,890,000 kw.

A characteristic feature of the regional construction plan is

the relatively great importance of hydro-electric stations, to which 1,900,000,000 rubles have been allotted out of a total of 3,690,000,000 rubles to be expended on regional electric station construction. Most prominent on the list of hydro-electric stations to be built are the three gigantic Middle Volga stations: the Yaroslavl Station—capacity 100,000 kw., the Balakhna Station—200,000 kw., and the Perm Station—310,000 kw.; the completion of Svir Station No. 3 and the construction of Svir Station No. 2 with a capacity of 144,000 kw.; the construction of the Transcaucasian hydro-electric stations—the Kanakir, Khram, Terter and Gumush power plants—the first and second sections of the Chirchik Station in Central Asia and several other stations.

The biggest of the steam stations to be built are the Leningrad and the Moscow central heat-and-power stations with a capacity of 100,000 kw. and over, the Stalinogorsk Station, the capacity of which is being raised to 400,000 kw., the Stalingrad and Middle Ural Stations of 100,000 kw. capacity each, the Chelyabinsk Station —100,000 kw., the Kemerovo Station—148,000 kw., the extension of the Zuyevka Station to 250,000 kw., the new Donetz Basin Station designed for 300,000 kw. at full load and a number of other stations.

The construction of this system of regional electric power stations establishes huge energetic junctions interconnected by a high-voltage network which prepares the road for the establishment of a unified Union-wide high-voltage network. It is planned to appropriate the sum of 842,000,000 rubles for the construction of electric transmission lines.

The coal industry entered the Second Five-Year Plan period with much pit construction left unfinished. The aggregate capacity of pits under construction was 142,300,000 tons on January 1, 1933, while that of the 437 pits in operation was 110,700,000 tons.

Of the total of 3,500,000,000 rubles invested in the coal industry, the Second Five-Year Plan allots 1,170,000,000 rubles for pit construction which ensures the putting into operation of 178 pits having an aggregate capacity of 143,000,000 tons and representing a total value of 1,200,000,000 rubles. In consequence the aggregate capacity of coal pits in operation at the end of the Five-Year Plan period will be 238,800,000 tons, which assures the necessary accumulation of reserve capacities. It is planned in addition to sink during the course of the five years 65 new pits with an aggregate capacity of 47,200,000 tons which guarantees

the further development of coal mining during the first years of the third quinquennial period.

Construction at the pits in operation designed to maintain their production capacity, to extensively apply mechanized methods of coal mining, to provide equipment for surface operations, develop the transportation and power systems, organize repair shops and build coal-dressing and briquetting plants occupies a very important place in the coal industry's construction plan.

Capital investments in coal mining ensure the solution of the problem of the all-embracing mechanization of this industry, which raises the technical level of the coal industry much above that of the First Five-Year Plan period. Construction for housing, cultural and social purposes in the coal-mining districts carried on by the industry itself is planned to reach a value of 1,200,000,000 rubles, which will make it possible to open for occupancy 5,500,000 sq. metres of additional housing space and will provide for a standard of 7 sq. metres of housing space per person, this allowance to extend in the Donetz Basin to 80 per cent, in the Eastern districts—to 90 per cent and in the Moscow Basin—to 85 per cent of the entire population of the respective districts.

The construction plan of the oil industry for the Second Five-Year Plan period provides for the investment of 4,700,000,000 rubles, or 325 per cent of the amount expended for this purpose under the First Five-Year Plan. Investments in construction for the oil industry are rising in proportion from 6.5 per cent of the total appropriation for construction purposes in heavy industry in 1933 to 10.5 per cent in 1937.

Of the total sum invested in the oil industry, 1,950,000,000 rubles or 41.4 per cent were allotted for boring, 1,030,000,000 rubles for factory construction and 309,000,000 rubles for the laying of pipe lines.

A considerable proportionate increase has been planned for boring operations in districts which at the beginning of the Second Five-Year Plan period were exploited to only a minor extent.

The factory construction plan provides for the establishment of the necessary capacities for the primary refining and cracking of oil, increasing the capacity of primary refineries from 23,400,000 tons as of January 1, 1933, to 40,900,000 tons as of January 1, 1938, and the capacity of cracking plants—from 3,000,000 tons (refining of masut) to 15,800,000 tons.

Powerful oil refineries are under construction in Orsk, Saratov,

Gorky, Voronezh, Stalingrad, Khabarovsk and so forth. With regard to laying pipe lines, the Plan specifies that the Caspian-Orsk pipe line be completed and the following lines be laid: Makhach Kala–Voronezh, Neftedag-Krassnovodsk; that the Baku-Batum line be enlarged and a number of other less extensive lines be laid. The Plan further contemplates the construction of the Grozny-Armavir oil-products line and of an oil-products line from Trudovaya to Dniepropetrovsk.

Construction in the iron and steel industry occupies a particularly prominent place in the general plan of construction. The size of the appropriation itself—9,340,000,000 rubles as compared with 2,960,000,000 rubles invested in construction for the iron and steel industry under the First Five-Year Plan—indicates the vast extent of the construction planned. A great portion of the total construction (representing a value of 4,280,000,000 rubles) is designed to complete the construction of new iron and steel plants commenced during the First Five-Year Plan period; 1,090,000,000 rubles are being allocated to new iron and steel plants to be commenced during the years of the second period; 2,820,000,000 rubles have been appropriated for the reconstruction of plants in operation and for repairs, while 1,150,000,000 rubles are being invested in the iron-ore, manganese and rare elements industries.

During the Second Five-Year Plan period the construction of the following plants is being completed: Magnitogorsk, Kuznetsk No. 1, Zaporozhye, Azov Steel, Krivoy Rog, Petrovsk (Transbaikalia), Tula and Lipetsk Works and the Nikopol and Pyervo-Uralsk pipe-rolling mills. Construction of the Tagil Plant to half of its scheduled capacity is being completed; building operations are being developed at the site of the Bakal Plant where two blast furnaces are to be blown in in 1937, at the Khalilovo, the second Kuznetsk and the Far Eastern Plants where the first aggregates are to be put in operation the same year.

Altogether the sum of 5,370,000,000 rubles, or 65.6 per cent of the total amount being invested in the iron and steel industry (exclusive of ore mining), have been allocated to the construction of new iron and steel plants.

The construction plan for the iron and steel industry, which ensures the smelting of 16,000,000 tons of pig iron in 1937 and the setting up of huge reserve production capacities, lays particular stress on building steel-smelting and rolling mills, the lagging condition of which made itself keenly felt at the beginning of the Second Five-Year Plan period.

While completing the construction of a large group of new establishments which have already been prepared for the starting of operations and of major reconstruction jobs at establishments in operation, the machinery industry's construction plan for the Second Five-Year Plan period provides for the commencement of construction of a large group of new machinery plants. It suffices to state that out of a total of 8,060,000,000 rubles to be invested in construction for the machinery industry, 2,690,000,000 rubles have been assigned to items of construction taken over from the First Five-Year Plan period and 2,940,000,000 rubles for new construction under the Second Five-Year Plan.

The machinery industry's construction program lays particular stress on the building of transportation equipment plants. Establishments like the Lugansk, Orsk, Kuznetsk and Novocherkassk Steam Locomotive Works, the Kashira Electric Locomotive Works, the Nizhni-Tagil, Kazan, Kuznetsk and Irkutsk Railroad Car Building Works, the automatic coupling plant in West Siberia and the group of river and maritime shipbuilding plants occupy the most prominent places in the plan of new construction for the machinery industry. Besides fully completing construction and developing production at such giants of industry as the Ural Machinery Plant, the Kramatorsk Machinery Plant and the Siberian Machinery Plant, the Second Five-Year Plan sets forth as one of its principal tasks the solution of the problem of reconstructing the transportation system, for which purpose the requisite machinery production base is to be developed.

Much construction is also planned for the various branches of the electrical machinery industry, including the electrical communication industry, designed to completely satisfy the country's equipment and apparatus requirements.

In this group of plants the following deserve special note: the Kharkov Turbine Plant, the Sverdlovsk Transformer and Electrical Apparatus Plants, the mercury rectifier, insulation, electric bulb and searchlight works in the Moscow Region, the accumulator plants, the automotive and tractor electrical supplies plant in the Saratov Territory and the radio manufacturing plants.

The creation of a huge base for the manufacture of tractors and automobiles was a great victory for the First Five-Year Plan.

The Second Five-Year Plan contemplates vast construction operations in the automobile industry: the capacity of the Gorky Automobile Plant is being raised to 300,000 motor vehicles a year, that of the Stalin Plant in Moscow to 80,000 motor vehicles and

that of the Yaroslavl Plant—to 25,000 heavy trucks; new plants are to be built in West Siberia and Stalingrad with a capacity of 100,000 3-ton trucks each, while in Samara a plant designed for the production of 25,000 heavy trucks is to be erected. A numerous group of establishments co-operating with the above automobile plants, particularly a powerful new ball-bearing plant, plants manufacturing automotive and other electrical equipment and accessories, etc., is being developed.

The vast expansion of machine-tool plants is of great importance in the reconstruction of industry as a whole and of machinery production in particular. While plants the construction of which was carried over from the First Five-Year Plan period—the Kharkov, Moscow and Gorky Milling-Machine Plants and the Murom Plant—are being built up to their full capacity, it is planned to erect and put into operation new plants, in particular two grinding-machine plants, in the Ukraine and the Central Black Soil Region, heavy machine-tool plants in Sverdlovsk, precision machinery and automatic machine-tool plants in the Ukraine, etc.

In the textile machinery industry the Plan provides for the radical reconstruction of the factories in operation, and the construction during the early years of the Second Five-Year Plan period of a group of plants which are to manufacture 280,000,000 rubles' worth of textile equipment and represent a total value of 140,000,000 rubles.

The manufacture of equipment for the food industry is being greatly developed.

The Plan for the chemical industry is characterized by particularly extensive new construction operations. Of the total sum of 4,770,000,000 rubles to be invested, 3,500,000,000 rubles have been allotted to new construction, of which 1,400,000,000 rubles are to be expended on construction carried over from the First Five-Year Plan period, and 2,100,000,000 rubles on plants newly begun during the Second Five-Year Plan period. New construction on so vast a scale is necessitated by the lag of this industry in the past and the need to create in the shortest possible period of time a powerful base for the application of chemical processes in national economy.

Provision is made for the construction of a large group of synthetic-ammonia, sulphuric-acid and other plants in the basic branches of the heavy chemical industry which will create the necessary increase in production capacity so that the assigned

production program can be maintained. It is contemplated to carry out extensive construction of synthetic-rubber works, of works producing aniline dyes, varnishes and lacquers, chemical plastic materials, rubber-asbestos products, etc. The Plan inaugurates the creation of a whole group of fuel-chemistry plants which ensure the rational utilization of local fuel and the extraction of liquid fuel and other products from sapropelic coal, peat and oil shale.

During the Second Five-Year Plan period construction for light industry and the food industry is developing on an unprecedented scale, which ensures a vast increase in output. In addition to renewing and augmenting the fixed capital of light industry and the food industry to a great extent, this construction also gives rise to a new geographic distribution which brings the processing centres of agricultural raw materials in closer proximity to the producing regions, and in several instances establishments engaged in processing agricultural raw materials are becoming pioneers in the development of certain agricultural crops in new districts.

Of the total sum of 9,200,000,000 rubles to be invested in light industry as compared with 1,200,000,000 rubles invested under the First Five-Year Plan, 5,370,000,000 rubles have been allotted to new construction, inclusive of 4,730,000,000 rubles for factories and mills newly commenced during the Second Five-Year Plan period. In the food industry in which 5,340,000,000 rubles have been assigned to construction, new construction has been allowed 2,820,000,000 rubles, more than half of which sum is intended for establishments to be newly commenced during the Second Five-Year Plan period.

The cotton goods industry entered the period of the Second Five-Year Plan with a capacity of 3,600,000,000 metres of fabrics and will increase this capacity to 5,300,000,000 metres by the end of this period.

The Plan provides for the construction of 15 huge new industrial combinations, 4 of which are to be located in Central Asia, 2 in Transcaucasia, 3 in West Siberia, 2 in the Ukraine and one each in Kazakstan, Northern Caucasus and the Saratov Territory. The production capacity of 5 of these combinations—the Tashkent, Barnaul, Khojent, Charjui and the Transcaucasian plants—is to be 200,000 spindles each, while practically all the other plants are to be equipped with 100,000 spindles each. This construction enables the cotton goods industry to take a big step forward, making possible rapid rates of development of output in new regions.

In the woollen-goods industry it is planned to build 12 big woollen mills, 2 of which are to be located in the Ukraine, 2 in West Siberia, 1 in East Siberia, 1 in the Chelyabinsk Region, 2 in the Azov-Black Sea Territory, 2 on the Lower Volga, 1 in Kazakstan and 1 in the Kirghiz Autonomous Socialist Soviet Republic. Much construction is contemplated for the linen-goods industry (12 big mills), for the knit-goods, leather and footwear, silk and other branches of light industry.

The extensive development of branches producing substitutes and new kinds of raw materials, thus supplementing the raw material base of light industry, and the particularly great development of those branches which attend to cultural needs, such as the musical instruments industry and the industry manufacturing scientific school supplies which were still in their infancy at the beginning of the Second Five-Year Plan period, are characteristic features of light industry's construction plan.

Having undergone extensive development during the last year of the First Five-Year Plan period, construction for the food industry is characterized by the great volume carried over from that period. While providing for the completion of these construction jobs, new construction is planned to develop to a still greater extent in all branches of this industry. Provision is made for the erection of 40 meat-packing plants, the construction of 17 of which has been carried over from the first period while 23 are new projects. The construction mapped out for the fish industry, in creating a powerful fishing fleet and a base for the industrial working up of fish products, ensures technically advanced methods in districts hitherto using handicraft methods of production. An extensive network of auxiliary establishments, of shore facilities, cold-storage plants and canneries is being built up at the same time, thus ensuring rational dressing and curing, and the creation of the conditions necessary for the development of new districts.

Factory construction for the sugar industry, which at the beginning of the Second Five-Year Plan period was concentrated almost entirely in the Ukraine and in the Central Black Soil Region, sets up new sugar-producing districts along the Middle Volga, in the Saratov Territory, Kazakstan, the Far Eastern Territory and Transcaucasia, and considerably enhances the relative importance of Central Asia, West Siberia and the Saratov Territory. Altogether 25 sugar refineries are to be built, 12 of which are new projects

while the construction of 13 was carried over from the First Five-Year Plan period.

In the canning industry the organization of the processing of agricultural raw materials in districts where they are grown involves an increase in the relative importance of the Stalingrad Territory, Transcaucasia and Central Asia. Large-scale canning is being organized for the first time on the Middle Volga, in East Siberia, the Northern Territory and in the White Russian Socialist Soviet Republic.

Under the Second Five-Year Plan foodstuff manufacturing is being transformed into a powerful, technically advanced large-scale industry which ensures the technically most rational processing of agricultural raw materials and the supply of high-grade products to the toiling masses.

In agriculture the first quinquennium was a period during which the fixed capital of socialist farming was being created, a period during which construction proceeded with particular intensity.

The Second Five-Year Plan while completing the socialist reconstruction of agriculture specifies as the principal task in the realm of agricultural construction the development of a technical base adequate to the new social forms of agricultural production, and transforms agricultural labour into a variety of industrial labour. Additional hundreds of thousands of tractors, motor vehicles and complex agricultural machines as well as millions of tons of fertilizer, extensive irrigation and amelioration operations and a vast program of construction for production and for cultural and social purposes are completing in the main the technical revolution in Soviet agriculture and render it the technically most advanced agriculture in the world.

The Second Five-Year Plan period is a period during which extensive machine and tractor station construction is carried on, so that the number of these stations will increase to 6,000 and their services will extend to the entire collective farm acreage. The main objective of State farm construction consists in the completion of the organizational and economic consolidation of the State farms, in the creation of all conditions required to make possible the most efficient utilization of the vast technical facilities which transform the State farms into model large-scale enterprises in field cultivation as well as in stock-raising.

Of the total volume of agricultural construction to be carried

out at State expense—15,200,000,000 rubles[1]—5,500,000,000 rubles have been allotted for the building up of State farms and 6,400,000,000 rubles for the building up of machine and tractor stations.

Thus, while State farm construction exhibits a 1.2-fold increase in comparison with the First Five-Year Plan period, the increase in machine and tractor station construction is 5.4-fold. State-financed construction on collective farms comprises 1,200,000,000 rubles; if all governmental measures are included—irrigation, amelioration, land regulation, re-settlement, the building up of a system of veterinary stations and construction for training cadres and for scientific purposes—this sum will rise to 2,100,000,000 rubles.

Of great importance is the possibility created in agriculture of planfully mobilizing the means and the labour of the collective farms and collective farmers themselves and of directing them into channels which aid agricultural construction. Therefore, while the bulk of capital investments made by the State has been assigned to the pivotal points in the technical reconstruction of agriculture, the construction plan takes into consideration the possibility of developing auxiliary construction by drawing upon the means of the collective farms. If these supplementary means are included, capital investments in agriculture total 20,200,000,000 rubles, or 187 per cent of the amount so invested under the First Five-Year Plan.

Further improvement of agriculture's technical equipment is the main feature of all phases of construction operations. During the Second Five-Year Plan period agriculture will be supplied with tractors having an aggregate rating of 8,680,000 h.p., agricultural machinery and implements representing a value of approximately 2,600,000,000 rubles and 170,000 motor vehicles. In addition to carrying out an extensive program of mechanization of the principal agricultural processes, the construction plan sets up a powerful industrial repair base for the rapidly increasing number of machines, tractors and automobiles in agriculture and assures the extensive primary processing of agricultural raw materials. The total capital invested for the purpose of developing and consolidating the new technical base of agriculture—the tractors, automobiles and machinery as well as the construction of electric power stations, repair shops and agricultural processing

[1] Expenditures incurred by the Workers' Supply Departments in carrying out farming measures under the construction plan in industry are not included in this sum.

plants—is 7,600,000,000 rubles, an enormous amount representing more than half of all investments in agriculture within the scope planned by the People's Commissariat of Agriculture and the People's Commissariat of State Farms.

The mastery of the production of the new enterprises of socialized agriculture, the mastery of the new technique, requires a vast amount of new construction for economic, housing, cultural and social purposes.

The amount to be invested under the Second Five-Year Plan for these purposes out of State resources is 2,100,000,000 rubles. The Plan at the same time contemplates the systematic utilization of the means and labour of the collective farms themselves to establish the material conditions necessary for the organizational and economic consolidation of the collective farms. The sum of 1,300,000,000 rubles is to be secured for the aforesaid purposes.

The development of socialized stock-raising necessitates the construction of the requisite new farm buildings. It is therefore planned to assign 1,100,000,000 rubles for stock-raising and veterinary structures and to procure 1,000,000,000 rubles for this purpose among the collective farms themselves.

Great sums are being appropriated for construction of veterinary buildings, for water supply, the development of forage bases and various other measures required to develop stock-raising.

In the field of irrigation and amelioration, the Second Five-Year Plan provides for increasing the irrigated area by 1,000,000 hectares and the drained area by 2,300,000 hectares, which ensures the required additional irrigated area for industrial crops and sets up a broad base for the large-scale utilization of irrigation and amelioration in grain growing. Great importance attaches in this respect to organizing the irrigation of 130,000 hectares in the Trans-Volga Region by locally draining the spring waters of small Volga tributaries. The completion of the Vakhsh construction project designed for 41,000 hectares, the construction operations along the Shakhrud system, at the Murgab Oasis, irrigation of the Famine Steppe and the Terter irrigation system are among the most important new irrigation projects. The amelioration plan includes operations like the draining of 600,000 hectares in the Far Eastern Territory, 30,000 hectares in the sub-tropical areas of Transcaucasia (Colchis), 125,000 hectares for the planting of industrial crops and for meadow lands in White Russia.

Of great importance also is the adopted schedule of ameliora-

tion operations to be conducted in connection with preparing land for an increase of 5,000,000 hectares in the sowing area of the consumers' belt. The amount to be invested in irrigation and amelioration operations during the years of the second five-year period has been set at about 1,800,000,000 rubles exclusive of the means to be raised among the collective farms.

Construction for the transportation system constitutes one of the major sections of the construction plan for the period of the second quinquennium. The new geographic distribution of the productive forces which the First Five-Year Plan period inaugurated, and the further changes made in this regard during the second period, the general growth of national economy and the consequent increase in the volume of freight shipments make great demands on every mode of transportation. This is precisely the reason why the construction plan provides for a considerable increase in the proportion which transportation forms of total investments, by allotting 26,300,000,000 rubles, or 19.8 per cent of the total sum to be invested in national economy, to construction for the transportation system. This compares with 8,900,000,000 rubles actually invested during the First Five-Year Plan period, or 17.7 per cent of total investments in national economy.

The figures quoted above do not include the expenditures on a large group of operations conducted for the purpose of establishing a powerful repair base for all modes of transportation, and for the manufacture of spare parts. Investments for the latter purposes total 2,000,000,000 rubles, of which more than 1,360,000,000 rubles have been appropriated to establish repair shops and auxiliary enterprises in the railway transportation system, more than 100,000,000 rubles for repair shops in the waterway transportation system and 550,000,000 rubles for such shops in the automobile transportation system. This volume of construction is indispensable for the proper exploitation of the vastly increasing technical equipment of the entire transportation system.

The construction plan takes as its points of departure the need to reinforce to the utmost, and to effect a radical technical reconstruction of, the principal railroad trunk lines which provide outlets from the East and the South to the Central Area and the North; the building of a number of new railroad lines connecting new industrial centres; the maximum development of waterway transportation on the principal river lines of the Soviet Union; the creation of new waterways, of the first group of automobile high-

ways and of a vast network of vehicular roads leading to railroads and main waterways. The great development of airway transportation is designed to establish airway lines between the Central Area and the most remote points of the Soviet Union, together with the extensive utilization of aviation for economic and cultural purposes.

Simultaneously with the quantitative increase in transportation facilities and the decided rise in the technical level of the transportation system, the correlation between the individual modes of transportation is undergoing a change. The U.S.S.R. is becoming a country in which short-distance hauling will be done primarily by motor vehicles, in which the vast network of local transportation will base itself on reconstructed railway and waterway trunk lines functioning as a reliable arterial system in the rapidly expanding national economy.

Structurally, the railroad construction plan is characterized by the concentration of the bulk of investments on the reconstruction of the principal trunk lines in operation. Thus, of the total sum of 18,700,000,000 rubles invested under the People's Commissariat of Transportation, construction on operating lines absorbs 10,100,000,000 rubles, expenditures for new rolling stock—3,350,000,000 rubles and the building of new railroad lines—2,670,000,000 rubles.

The reconstruction of the road-bed represents one of the biggest items in the reconstruction of the railroads in operation. The Plan as adopted maps out an extensive scheme of road reinforcement measures which provides for a shift to type "1A" rails for electrified lines and type "2A" for lines served by type "FD" locomotives or by Diesel locomotives. Road ballasting is being improved, with the adoption of crushed stone ballast on an extensive scale.

A length of 20,000 km. of light rails will be replaced by heavy rails. The grade reduction contemplated for a number of congested lines will have important results. With the introduction of automatic brakes and couplings, rolling stock is being utilized to a much greater extent. By the end of the Five-Year Plan period all freight cars will be equipped with automatic brakes and half their number with automatic couplings.

The transport rationalization measures outlined, particularly the reconstruction of the communication system, considerably increase the carrying capacity of a number of important lines. Thus, 8,300 km. of track will be equipped with automatic block signals at the most congested sections. The most prominent among them include the following electrified lines: Merefa-Lozovaya-Rostov-

Prokhladnaya, Moscow-Gorky, Moscow-Kharkov-Merefa, Chelyabinsk-Novosibirsk-Anzherka and Moscow-Leningrad; the connecting lines between the Donetz Basin and Krivoy Rog, the Ural lines, the electrified sections of the Transcaucasian railroad and a number of other lines.

Under the Second Five-Year Plan electric traction is being introduced on an extensive scale throughout the railroad system. The trunk-line electrification plan concentrates investments largely on the lines of the Donetz Basin, the Urals, the Northern Caucasus, Transcaucasia and the Ural-Kuznetsk Combination. Thus the transportation networks of most vital importance in the economic life of the country are being provided with the most perfected type of traction.

According to the plan for the construction of new railroads, 14,500 km. of new lines are to be built, of which 11,000 km. are to be opened for permanent and 1,900 km. for temporary operation during the Second Five-Year Plan period, thus raising the total length of lines in operation in the Soviet Union to 94,000 km.

In addition to completing the great volume of construction carried over from the First Five-Year Plan period and the building of lines of local importance and of small stretches laid to eliminate curves or relieve traffic at congested junctions and sections of trunk lines, it is planned to construct a number of important new lines. These include the following: Gorky-Kazan, Kazan-Bugulma, Sverdlovsk-Kurgan, Ufa-Magnitnaya, Uralsk-Iletsk, Karaganda-Balkhash, Rubtsovka-Ust Kamenogorsk, Akmolinsk-Kartaly, the first section of the Lena railroad, the completion of the Moscow-Donetz Basin and the Novosibirsk-Lena lines, the beginning of the construction of the railroad which is to run across the Caucasian mountain range and finally the extensive development of building operations on the Baikal-Amur trunk line.

Of the total of 4,300,000,000 rubles allotted for waterway transportation construction, 1,200,000,000 rubles have been allocated to hydro-technical construction for new waterways and 600,000,000 rubles for hydro-technical construction along the waterways in operation.

The second item of major importance is the appropriation of 1,100,000,000 rubles for the mercantile fleet which ensures a considerable increase in its tonnage.

The planned construction for the waterway transportation system taken in conjunction with investments intended for hydro-

electric construction makes it possible to begin the realization of the vast program of reconstruction of the Volga River during the years of the Second Five-Year Plan period. As a result of the construction of the Middle and Upper Volga hydro-electric stations and the respective locks, of the construction of the Moscow-Volga Canal, the Volga-Don Canal and the reconstruction of the Mariinsk System, a continuous large-draught water route is being formed uniting the Caspian, the Baltic and the Black Seas. Parts of this water highway will be ready for traffic already during the course of the Second Five-Year Plan period. The sums to be invested in the reconstruction of the Volga and the outlets from its basin, including the irrigation of the Trans-Volga Region by locally draining the spring waters of small Volga tributaries, total 2,800,-000,000 rubles for the five years.

The road-building program provided for in the Plan increases the total length of roads by 210,000 km., including 30,000 km. of stone-coated roads.

While completing the construction of a large group of Eastern highways and carrying into life the vast program of road building intended to establish connection with railroad and waterway trunk lines, the road-building program for the Second Five-Year Plan period is giving rise to the first automobile highways uniting Moscow with Leningrad, Minsk, Kharkov, Rostov, Orjonikidze, Tiflis and even Khabarovsk, extending the through-route as far as Kurgan during the Second Five-Year Plan period. Among the through-routes being completed are: Leningrad-Kiev-Odessa, and Kharkov-Sebastopol.

The total of 4,000,000,000 rubles which has been allotted for automobile road construction and maintenance under the Central Board of Road Transportation includes 2,960,000,000 rubles to be invested in road construction and maintenance, 600,000,000 rubles for the All-Union Automobile Supply and Repair Association and 240,000,000 rubles for the All-Union Automobile Transportation Association.

The labour to be contributed by the population in road building has been set down as representing 1,700,000,000 rubles which ensures the realization of a vast program of local road construction.

It is planned to build the automobile repair works, shops and stations made necessary by the increasing number of motor vehicles so that the latter may be assured of the requisite preventive repairs and overhauling.

An extensive road-building program for the agricultural districts has been incorporated in the Plan under which the improved types of roads are being concentrated in the regions having machine and tractor stations and State farms.

The mastery of the technique of the new enterprises in industry, transportation and agriculture, the improvement in the material welfare of the toiling masses and the rise in their cultural standard require that construction for cultural and social purposes be developed on a large scale. The Second Five-Year Plan of construction provides for a total expenditure of 32,500,000,000 rubles on construction for housing, communal, cultural and social purposes, as against 10,300,000,000 rubles invested during the First Five-Year Plan period. This increase in investments ensures the vast development of housing construction in the principal industrial centres, accelerated municipal construction and extensive development of construction for the public health system and for educational purposes.

Housing construction during the Second Five-Year Plan period has been allotted 13,400,000,000 rubles which includes 12,500,000,000 rubles for urban housing construction. This volume of construction will provide 69,600,000 sq. metres of housing space (of which 3,800,000 sq. metres are intended for trading and other premises) so that the entire available housing space, after deducting discarded space, is increasing from 185,000,000 sq. metres in 1932 to 246,500,000 sq. metres in 1937. The average per capita housing space for the Soviet Union shows an increase from 4.66 sq. metres in 1932 to 5.35 sq. metres in 1937.

The volume of construction for municipal purposes has been fixed at 7,100,000,000 rubles as against 1,800,000,000 rubles in the First Five-Year Plan period.

Of this total, municipal construction in cities by City Soviets accounts for 6,200,000,000 rubles.[1] The balance will be invested by industrial and other enterprises being built in newly settled districts, or by enterprises carrying out municipal construction on their own factory premises.

Prominent among the various measures carried out in cities is sanitation for which 2,100,000,000 rubles have been assigned as against 500,000,000 rubles under the First Five-Year Plan. As a

[1] Inclusive of construction of municipal electric stations, auxiliary and miscellaneous enterprises for various municipal services, this figure rises to 6,900,000,000 rubles.

result of these investments the number of cities possessing centralized water supply systems is growing from 366 to 440, so that all cities in the Soviet Union having a population exceeding 10,000 will have running water. The number of cities provided with a sewage system is increasing from 55 to 125. As a result of the sanitary and hygienic measures taken, the capacity of public baths is tripling and centralized laundry service in mechanized laundries for the urban population is growing considerably.

Construction for urban transportation is planned to absorb 2,330,000,000 rubles, which makes it possible to reconstruct the street-car lines in all the principal cities and to inaugurate street-car lines in 20 additional cities, to institute bus service in 200 cities as compared with 117 cities during the First Five-Year Plan period and to make extensive use of waterway transportation for local communication.

Of great importance is the construction of the first line of the Moscow subway on which 1,200,000,000 rubles are being expended.

The Plan provides for major operations in the laying of gas pipes and heat-and-power development for cities, in street paving, landscape architecture and other measures entering into proper city planning.

The building of new and reconstruction of old cities is assuming particularly great dimensions under the Second Five-Year Plan. The vast scale on which are being erected clubs, theatres and stadiums, the Palace of Soviets in Moscow and Houses of Soviets in other big cities of the U.S.S.R., the construction of Parks of Culture and Rest jointly with the reconstruction of municipal services, which are radically changing the face of the most important urban centres, is a highly potent factor in raising the cultural and material level of the toiling masses.

Construction for educational purposes is to absorb 3,150,000,000 rubles, of which 2,420,000,000 rubles have been allotted for construction for mass education and the balance for construction for the training of cadres engaged in education, scientific work, art and publishing. In addition to these investments the Plan provides for the extensive construction, directly by industrial enterprises, of educational facilities such as clubs, Red Corners, theatres, schools, etc. If these investments are included, expenditures for construction for educational purposes will total 4,000,000,000 rubles.

The principal problem of the construction plan in the realm

of mass education consists in building the necessary premises for the universal compulsory polytechnic training schools. School space is increasing from 143,000,000 cu. metres in 1932 to 203,000,000 cu. metres in 1937, which will permit the standard space per student to be increased from 7.5 cu. metres in 1932 to 9.27 cu. metres in 1937 and will make it possible to discontinue the practice of holding classes daily, including free days, and to eliminate triple sessions in the schools.

Construction for health protection purposes, the value of which has been set at 2,880,000,000 rubles, ensures the particularly extensive building of hospitals and prophylactic institutions, of health resorts, crèches, premises for the training of medical cadres and for carrying out miscellaneous public health measures.

The figures quoted do not include the great volume of public health construction to be carried out at the expense of industrial and other enterprises, especially in newly settled districts. The expenditure for such construction (crèches, public health stations, dispensaries, rest homes, etc.) has been set at 620,000,000 rubles for the Five-Year Plan period, which together with construction for health protection purposes totals 3,500,000,000 rubles.

Construction for cultural and social purposes represents a very important item in the construction plan. While it creates the necessary conditions for mastering the new enterprises, it is at the same time a powerful factor in improving the material and cultural welfare of the toilers.

Such are the principal allotments and their allocation which characterize the structure of the construction plan for the second quinquennial period by branches of national economy.

III

Construction jobs carried over from the First Five-Year Plan period represent a value of 17,100,000,000 rubles while the construction of new factories and mills begun during the Second Five-Year Plan period represents a value of 21,000,000,000 rubles. These figures sufficiently characterize the vast scale on which industry is developing during the latter period.

As year after year those factories whose construction was carried over from the First Five-Year Plan period are being completed and put into operation, a new round of huge construction projects is being inaugurated.

Giant factories, models of up-to-date engineering, have sprung up under the construction plan of the First Five-Year Plan period. But in a number of cases these were put into operation only during the last years of the first quinquennium and hence the considerable increase in the production capacity and volume of output that will result from the completion of the construction and the mastery of the technique of these bastions of socialist industrialization is quite evident.

The construction plan calls for a tremendous increase in the operating fixed capital of national economy. Whereas under the First Five-Year Plan, when 24,800,000,000 rubles' worth of construction was completed for the whole of industry, the new fixed capital put into operation constituted 15,700,000,000 rubles, during the Second Five-Year Plan period, when the volume of construction is multiplying 2.8 times, the value of construction put into operation is increasing to 69,100,000,000 rubles or 4.4 times because of the great volume of construction carried over.

Throughout the whole of national economy enterprises opened for exploitation during the Second Five-Year Plan period represent a value of 132,000,000,000 rubles. The fulfilment of this plan will denote a vast increase in the operating fixed capital of national economy.

Branches of national economy	Average annual capital (bill. rbls.)			In percentages	
	1928	1932	1937	1932 in % of 1928	1937 in % of 1932
A. Productive capital	29.0	58.8	140.6	202.8	239.1
of which:					
Industry	10.5	25.5	75 2	242.6	294.0
Agriculture	1.9	11.4	22.6	600.0	198 5
Transportation and communication	15.8	20.6	40.5	130.4	196.6
B. Capital allocated for social purposes	20.4	26.4	54.6	129.4	206.8
of which:					
Housing	10.7	14.5	26.8	135.5	184.7
Total for the whole of national economy	49.4	85.2	195.2	172.3	229.0

This increase in the total of instruments of labour and material resources intended to serve the social and cultural needs of the toiling masses most strikingly illustrates the profound changes which the technical base of national economy is undergoing in the course of fulfilment of the Second Five-Year Plan.

During the First Five-Year Plan period the operating fixed capital of national economy increased 1.7-fold. The rate of increase was particularly great in industry which augmented its production equipment 2.4-fold and in agriculture where during the years of the First Five-Year Plan period new fixed capital for socialist farming was being formed with particular intensivity. The technical equipment of the transportation and communication systems (the increase of which during the First Five-Year Plan period was 1.3-fold) fell behind the rate of increase of fixed capital for national economy as a whole. During the Second Five-Year Plan period the operating fixed capital of industry is being tripled. The decisive factor in this considerable lead exhibited by the growth of industry's fixed capital when compared with national economy as a whole is the large volume of construction carried over from the first quinquennial period. This together with the new construction being developed makes it possible, as was pointed out above, to more than quadruple the value of the enterprises to be put into operation during the Second Five-Year Plan period in comparison with the corresponding value for the First Five-Year Plan period. For agriculture the Second Five-Year Plan has stipulated a doubling of its fixed capital. Especially great is the rate of growth of the technical base of the machine and tractor stations, the fixed capital of which is growing 6-fold during the years of the Second Five-Year Plan.

The transportation system had no such carry-over construction at the beginning of the Second Five-Year Plan period as had industry. Therefore the rapidly rising rate of increase of the fixed capital in transportation, when compared with the First Five-Year Plan period, is solely to be attributed to construction during the second period. It must be particularly emphasized that by reason of the major changes effected in the technical base of the transportation system, the introduction of new types of rolling stock, the strengthening of the road-bed, the reconstruction of the communication system, the electrification of railroad transportation and other reconstruction measures, the carrying capacity of the transportation system is increasing to a much greater extent than

is indicated by the indices of the fixed capital expressed in value.

The group of construction appropriations as a whole, designated to serve the social and cultural needs of the toiling masses, is more than doubling. The available housing space is increasing 1.33-fold. The fixed capital in municipal services and public health protection is more than doubling, while the fixed capital invested for cultural purposes is likewise exhibiting a great increase.

Such is the composite picture presented by the general growth and the change in the internal structure of the production equipment of national economy.

The construction plan for the Second Five-Year Plan period firmly entrenches industry in its leading position. In 1937 the fixed capital in industry as a whole will constitute 38.5 per cent of the total fixed capital in national economy. For heavy industry this percentage will be 29.8 as against 30 per cent for all industry and 21.6 per cent for heavy industry at the beginning of the Second Five-Year Plan period. Characteristic of the structure of industry itself is the circumstance that while the fixed capital in industry as a whole is growing 3-fold, the fixed capital in the iron and steel industry is growing more than 4-fold during the years of the Second Five-Year Plan period, the fixed capital in regional electric stations is increasing 3.5-fold, in the chemical industry—4-fold and in the machinery industry—3-fold. While thus greatly strengthening the metallurgical base, the foundation on which the industrialization of national economy as a whole rests and on which the machinery industry is being developed, the construction plan stipulates a sharp increase in the production capacities of those branches of national economy which are of prime importance in the introduction of machine technique, electrification and the application of chemical processes—the principal lines to be pursued in the technical re-equipment of national economy.

As a result of this construction a number of very important branches of national economy are being provided with considerable reserve production capacities which prepare the way for the further development of national economy during the third quinquennium. This finds its most general expression in the circumstance that while industrial output is increasing 2.14-fold under the Second Five-Year Plan, the operating fixed capital is almost tripling in volume. This lead in the increase of fixed capital is the result of the considerable proportional increase in certain decisive branches

of heavy industry, in which much more fixed capital is required to obtain the same value of output than in the other branches of the manufacturing industry; it is the result of the considerably greater proportion of new enterprises that require the establishing of numerous auxiliary and service facilities in addition to setting up the production capacities which directly affect the volume of output; finally it is the result of the difficulties of assimilating the fixed capital which is growing by such leaps and bounds.

However, the extent of this lead in the increase of fixed capital itself attests the fact that what is taking place here is the creation of powerful reserve capacities in a number of branches of national economy. This situation may be illustrated in more concrete form by the following data. Thus it is planned to increase the aggregate capacity of regional electric stations (under the Chief Power Board) from 2,650,000 kw. at the beginning of the Second Five-Year Plan period to 6,650,000 kw. at the end of this period. If this capacity were to be utilized in full it would yield an output of 29-31,000,-000,000 kwh. while the quantity called for by the Plan is 24,500,-000,000 kwh.

In the coal industry the planned output capacity at the end of the Second Five-Year Plan period will be 238,800,000 tons while the quantity of coal to be extracted has been set at 150,000,-000 tons (exclusive of handicraft co-operative production).

In the iron and steel industry the number of blast furnaces is increasing from 103 to 139, with an increase in their aggregate volume from 36,900 cu. metres to 78,400 cu. metres, making possible the smelting of more than 21,800,000 tons of pig iron while the planned output is 16,000,000 tons of pig iron. In the copper industry the capacities of the establishments being put into operation will total 207,000 tons while the production plan specifies 135,000 tons (exclusive of reclaimed copper).

Tractor plant capacity is reaching a total of 276,700 units per annum by the end of the Second Five-Year Plan period (in terms of 15 h.p. tractors) while the production plan stipulates only 167,-000 tractors; the capacity of the automobile plants is increasing to 360,000 motor vehicles but the production plan calls for only 200,000 vehicles. Locomotive works will have a capacity of 4,000 units in type "E" and "SU" equivalents while the Plan calls for the production of 3,210 units. By the end of the Second Five-Year Plan period the cement works will have a capacity of 54,700,000

barrels yet their production plan will call for only 48,300,000 barrels.

Sufficient instances have been quoted to depict the policy laid down in the Second Five-Year Plan, *viz.*, a policy of raising the coefficient of capacity utilization and of setting up reserve capacities. In a number of cases the aggregate capacity stated above is obtained at the end of the last year of the Five-Year Plan period and thus cannot be fully utilized within the course of this period, but even with this correction it would not be wrong to say that the construction plan assures not only the increase in the technical base necessary to fulfil the production program but also considerable reserve capacities in a number of important branches of national economy.

The construction carried out during the Second Five-Year Plan period elevates the national economy of the U.S.S.R. to a considerably higher technical plane, thus ensuring the vast program of technical reconstruction in the whole of national economy. This reconstruction program, which bases itself on the successes achieved by the Soviet Union during the First Five-Year Plan period in establishing its own heavy industry base, advances the U.S.S.R. to first place in Europe in regard to production capacity and technical level of industry, and to first place in the world in technical level and volume of output of the principal branches of agriculture.

IV

The construction plan for the second quinquennial period which is based on the mastery of the new fixed capital set up is a plan of extensive development of new construction, of the development of the natural wealth of the Soviet Union, of the extension of industry into new districts and of the overcoming of the economic backwardness of the national districts.

The completion of technical reconstruction in national economy requires that the mainstays of heavy industry be distributed geographically in such a way that while extensively drawing upon new sources of the country's natural wealth for industrial exploitation they may serve as hearths of national economic reconstruction not only in the most important economic districts but also in the formerly backward national republics and regions. Thus it is one of the cardinal tasks of the Second Five-Year Plan period relating to the geographic distribution of the forces of production

to establish a number of auxiliary centres for the production of coal, iron and machinery founded on the consolidation and the further development of the main coal-and-iron and machine-manufacturing bases of the Soviet Union.

The Second Five-Year Plan period consummates the construction of the Ural-Kuznetsk Combination, the capacity of the Magnitogorsk Plant being raised to 8, and of the Kuznetsk Plant to 4 blast furnaces, while the first sections of the Tagil, Bakal and Khalilovo Plants, and the second section of the Kuznetsk Iron and Steel Plant are being put into operation and the reconstruction of the Ural iron and steel industry is being completed. The great increase in the capacity of the Kuznetsk, Karaganda and Ural coal pits makes it possible to increase the proportion of coal extracted in the districts of the Ural-Kuznetsk Combination to 27.3 per cent of the country's coal output in 1937 as against 17.3 per cent in 1932, while coal mining throughout the whole Soviet Union is undergoing a 2.4-fold increase. Parallel with the completion of building operations on the Ural Heavy Machinery Plant, with the construction of the Siberian Machinery Plant, the chemical apparatus plant in the Urals, the new machine-tool plants, the steel plant in Novosibirsk, the large group of factories manufacturing transportation equipment—the Orsk Steam and Diesel Locomotive Works, the Kuznetsk Steam Locomotive Works, the Ural Railroad Car Plant, the automobile plant in West Siberia and the construction of a number of plants for the electrical-machinery industry—the development of machinery production at the Ural-Kuznetsk Combination is acquiring great proportions. The chemical industry is expanding on a vast scale. In addition to further developing the Ural group of factories this industry is organizing the production of synthetic ammonium and sulphuric acid in West Siberia, while at the same time developing fuel chemistry and a number of other lines.

The construction of the Ural-Kuznetsk Combination occupies a particularly prominent place in the Second Five-Year Plan inasmuch as it combines the further development of the coal and iron industries with the vast expansion of the entire range of branches of heavy industry. While consolidating and developing this second coal and iron base of the Soviet Union, the Second Five-Year Plan provides for the formation of a number of new coal and iron bases which are of minor importance from the point of view of quantity of output but of major importance from the point

of view of national economy. These include the Far Eastern steel mill which will serve as a base for the economic development of the Far Eastern districts and for the reconstruction of their economic life, the Tula and Lipetsk Plants in the central part of the country, and the development of the manufacture of special steels in districts where the highly complicated machinery industry is concentrated. Of the total of 1,100,000,000 rubles being invested in newly begun construction for the iron and steel industry, about 50 per cent has been allocated to districts where this industry is being newly organized (the Far Eastern Territory, East Siberia, the Middle Volga and Transcaucasia).

The construction program of the iron and steel industry provides for further changes in the geographic distribution of this so highly important branch of national economy, changes which began to take shape during the first five-year period. This appears from the following table:

OUTPUT OF PIG IRON AND ROLLED PRODUCTS, BY DISTRICTS

(percentage of total)

Districts	Pig iron		Rolled products	
	1932	1937	1932	1937
South	69.9	59.2	64.1	56 0
East	24.3	32 8	16.8	32 3
Central Area	5.8	8.0	19.1	11.7
Total	100 0	100 0	100.0	100.0

Note: The output (rolled products) of the Red October Plant in Stalingrad is included in that of the Central Area.

The increased importance of the East which is particularly pronounced in the output of rolled products, and a certain reduction in the share allotted to the South especially in the case of pig iron are accompanied by a substantial increase in pig iron smelting in the Central Area and in smelting from the ores of the Moscow and the Central Black Soil Region, while the manufacture of rolled products by the steel industry of the Central Area, though increasing in absolute volume, is being considerably diminished proportionately. This is to be ascribed to the fact that in the Central Area steel is smelted from scrap, the available quantity of which

increases more slowly than the total iron and steel smelted throughout the country.

There is an analogous situation in construction for the coal industry where, parallel with the development of the second coal and iron base described above and the radical reconstruction and considerable increase in the coal production capacity of the Donetz Basin, coal extraction will be extensively developed in such basins as Karaganda, Central Asia, the Far Eastern Territory, Siberia, the Moscow Basin, Tkvarchelly and Tkvibuli in Transcaucasia, the Pechora coalfields and in several minor districts.

The following table shows the proportionate coal output of the individual districts at the beginning of the Second Five-Year Plan period compared with the geographic distribution of pit construction during this period:

Districts	Coal extracted in 1932, in % of total	Investments in pit construction during the Second Five-Year Plan period, in % of total
Donetz Basin	69.9	44.1
Moscow Basin	4.6	6.1
Urals	5.0	11.3
West Siberia	11.2	17.0
Kazakstan	1.2	7.5
East Siberia and Far Eastern Territory	6.6	10.5
Central Asia	1.2	3.5

While on the average the expenditure for the sinking of new pits during the Second Five-Year Plan period is 23.1 per cent of the total sum being expended for pit construction throughout the entire Soviet Union, for Central Asia this percentage rises to 48.1, for the Far Eastern Territory—to 39.7, for Karaganda—to 77.9, for the new districts—to 47.6, etc.

Of the new coal districts to be developed the Plan lays particular emphasis on the development of the coal deposits in the Far Eastern Territory, especially the Bureya District, as these deposits offer a solid foundation for the industrialization of the Far East.

As a result of the geographic distribution of pit construction indicated above, the proportion which the Eastern and Moscow Basins will form of the total coal output in 1937 will increase sub-

stantially. Thus in the Urals this proportion is increasing from 4.9 per cent in 1932 to 8.8 per cent in 1937, in West Siberia—from 11.2 per cent to 13.6 per cent, in Kazakstan—from 1.2 per cent to 4.8 per cent, in Central Asia—from 1.2 per cent to 2.0 per cent, in the Moscow Basin—from 4.6 per cent to 6.8 per cent, etc.

Together with these changes in the geographic distribution of the coal industry, all local fuel deposits—peat, oil shale, lignite—are being developed on an extensive scale which considerably diminishes the dependence of a number of districts upon long-haul fuel.

The above construction gives rise to a new geographic distribution of coal mining and iron manufacturing, these key industries of national economy, and makes it possible to distribute the principal branches of the machinery industry much more evenly and thus secure reconstruction on a wide national economic front embracing not only the principal economic centres of the country but also the formerly backward national republics and regions. The Second Five-Year Plan includes almost every district of the U.S.S.R. in its network of machinery producing plants. While the old industrial districts (Moscow, Leningrad) retain their leading role in developing the manufacture of highly complicated machinery, based on the completion of plants under construction, on the construction of a number of new plants and on large reconstruction operations (at the Russian Diesel Plant in Leningrad and the Compressor Plant, the Milling Tool Plant, the Gauge Plant, the Machine-Tool Construction Plant—experimental and individual models—and the Calculating-Machine Plant in Moscow, a number of plants manufacturing electrical machinery, including electrical communication machinery, and power machinery plants in Moscow and Leningrad), the Plan makes provision for the extensive development of the heavy-machinery industry in the Urals and in the Ukraine where, in addition to completing the construction of the Sverdlovsk and the Kramatorsk Plants to full capacity and the construction of new machine-tool and other plants, first-class machinery production bases are being formed the output of which will be able to satisfy the vastly developing construction requirements in adjacent districts. The construction of transportation equipment plants (the Orsk Steam and Diesel Locomotive Works, the Lugansk and Kuznetsk Steam Locomotive Works, the Novocherkassk Industrial Locomotive Works), the vast reconstruction and development of the Sormovo and Kolomna Plants,

the construction of a plant manufacturing castings for the locomotive and car-building industry of the Western Region, the construction of the Kashira Electric Locomotive Works and of the Ural and Kazan Car-Building Plants, in conjunction with the extensive construction of shipyards for the building of river and seagoing craft, create a powerful base for the manufacture of transportation equipment located at the most important junction points where the chief arteries of the transportation system intersect, thus enabling this base to serve most efficiently the reconstruction requirements of the railway and waterway transportation systems. The vast automobile plant construction program ensures the extensive development of this branch of production, the central regions of the European part of the U.S.S.R. and the Volga Area being made the main buttresses in the motorization of the country.

The construction of machinery plants designed to satisfy the technical re-equipment requirements in the several national districts is of the highest importance. In this category there is to be classed the construction of the Tiflis Engineering Works, of oil equipment plants in Transcaucasia, a structural iron works and an agricultural machinery plant in Central Asia; the construction of automobile assembly plants in the Far Eastern Territory, West Siberia, Central Asia, Northern Caucasus and the Ukraine; the construction of 2 radio apparatus plants in Chuvashia; the development of the machinery industry in White Russia, Buryat-Mongolia, Bashkiria, Tatar Republic and a number of other districts. The Volga Area (Gorky Territory, Tatar Republic, Middle Volga, Lower Volga) and the Northern Caucasus, where the building operations carried on under the First Five-Year Plan already established powerful centres of automobile, tractor and agricultural machinery manufacturing, of river shipbuilding and a number of other branches of industry, will be among the principal machinery manufacturing regions during the Second Five-Year Plan period.

As a result of this construction for the principal branches of heavy industry—coal, iron and machinery production—a new system of bases of support for the reconstruction of national economy is being established, a system which embraces the most remote districts, which is the foundation of the new geographic distribution of the forces of production, of the industrialization of the national districts and of the elimination of their economic and cultural backwardness.

In the chemical industry great importance attaches not only to the vast development of the basic branches of the heavy chemicals industry in the districts of the Ural-Kuznetsk Combination and of chemical manufacturing in the old industrial districts and in the Ukraine, but also to the further expansion of exploitation of the rich mined chemical resources of the Far North (Khibini), the organization of a powerful chemical industry in Central Asia and Transcaucasia, the further development of this industry in the Volga Area and the Central Black Soil Region, particularly the development of the construction of synthetic rubber works.

The regional distribution of electric power station construction has necessarily been planned on the basis of granting priority in electric power supply to the principal economic centres of the country and of creating the necessary reserve capacities to secure an uninterrupted supply of current. The construction of regional stations is the mainstay of the general plan of electric construction, which embraces regional as well as industrial and municipal electric stations. The greatest rates of increase in aggregate capacity of electric stations are planned for the eastern districts where industrial construction is being developed with particular intensiveness. Thus while the aggregate electric station capacity is multiplying 2.3 times for the Soviet Union as a whole, the installed capacity of the electric stations in West Siberia is growing 4.5-fold (from 98,500 kw. in 1932 to 441,200 in 1937), in Kazakstan—8-fold (24,500 kw. and 194,800 kw. respectively), East Siberia—5-fold (24,700 kw. and 125,100 kw. respectively), the Far Eastern Territory—6-fold (23,700 kw. and 147,700 kw. respectively), Central Asia—8.5-fold (43,200 kw. and 368,000 kw. respectively), Transcaucasia—3-fold (213,000 kw. and 657,200 kw. respectively). Great progress is being made in consolidating the power base of the Urals (capacity increasing from 469,600 kw. to 1,302,700 kw.) and of the Volga Area where the aggregate electric power station capacity is multiplying 2.6 times during the years of the Second Five-Year Plan. In the central industrial districts and in the Ukraine, where electric power supply has shown particularly great progress under the First Five-Year Plan, the Plan for the second five-year period ensures the requisite increase in production capacity, almost doubling (and in the Leningrad Region more than doubling) the installed capacity.

The changes by districts made in the geographic distribution of the installed capacity of electric power stations are extremely in-

dicative of the general changes in the territorial distribution of productive forces in the U.S.S.R., in so far as they predetermine corresponding rates of development in all branches of national economy dependent on electric power.

These changes are exhibited in the following table:

Districts	Installed capacity in % of total	
	1932	1937
U.S.S.R.	100.00	100.00
Old industrial districts (Leningrad, Moscow and Ivanovo Regions)	28.99	26.76
Volga Area (Tatar Republic, Middle Volga, Lower Volga, Gorky Territory)	10.54	10.23
Ukrainian S.S.R.	29.93	21.88
Districts of the Ural-Kuznetsk Combination (Urals, Bashkiria, West Siberia, Kazakstan)	13.06	18.26
East Siberia and Far Eastern Territory	1.03	2.50
Transcaucasia	4.54	6.03
Central Asia	0.92	3.38

The general eastward trend of industry and the high rates of industrialization of the national republics find particularly striking expression in these changes in the geographic distribution of the principal groups of power stations of the U.S.S.R. Analogous changes are taking place in the regional distribution of the current generated.

Construction in the field of heavy industry under the Second Five-Year Plan is completing in the main the formation of the principal bases of heavy industry with regard to their territorial distribution throughout the U.S.S.R. Thus there is created the fundamental production framework upon which the vast program of the country's natural resources and the reconstruction of national economy develops.

The territorial distribution of light industry and the food industry projected under the Second Five-Year Plan is of major importance for the economic development of a great number of districts.

The extensive development of new construction contemplated by the Plan for all branches of light industry and of the food industry conduces to the formation of a powerful technical base for the processing of local agricultural raw materials in the eastern

districts which formerly had no such base. Of the 15 new cotton goods combinations, 10 are to be constructed in Central Asia, West Siberia and Transcaucasia; of the 12 new woollen mills, 6 are being built in the eastern districts where, besides, 6 knit-goods mills, 9 silk mills, 19 leather and shoe factories and so forth are under construction.

The list of new establishments being built in the eastern districts for the food industry includes 8 meat-packing plants, 16 sugar refineries and 9 vegetable-oil factories.

The extent to which this construction changes the correlation between the individual districts in the output of light industry and the food industry already during the Second Five-Year Plan period appears from the following table:

Output of the Eastern Districts (Urals, Bashkiria, West Siberia, East Siberia, Far Eastern Territory, Kazakstan, Central Asia, Transcaucasia) in % of total output of the Soviet Union

	1932	*1937*
Cotton fabrics	1.77	4.28
Woollen fabrics	4.31	12.13
Leather footwear	9.84	24.98
Sugar	1.52	6.08

In bringing the processing establishments in closer proximity to the raw material bases, the territorial distribution of the new construction for light industry and the food industry in a number of cases causes industry to play the part of pioneer in organizing the production of agricultural crops in districts where these have not been grown before. In this respect the new geographic distribution of the sugar industry, and in some districts of the canning industry, is of particular significance. While construction for the food industry as a whole is being greatly decentralized by its diffusion among the several economic districts, the Second Five-Year Plan is bringing about the formation of two huge bases for the food industry—one in the Ukraine and one in the Volga Area—to which more than one-fourth of the total volume of construction for the food industry has been allocated.

The geographic distribution of light industry and the food industry mapped out by the Second Five-Year Plan supplements the planned geographic distribution of heavy industry. The new geographic distribution of all branches of industry is fraught with consequences of historic significance in the field of eliminating the

economic backwardness of the national districts. This backwardness—the heritage of the tsarist colonial regime which had converted the national districts into raw-material appendages of European Russia—was already overcome to a considerable extent during the course of the First Five-Year Plan period.

Consolidating and greatly strengthening the positions gained in this respect, the period of the Second Five-Year Plan is solving the problem of overcoming the economic backwardness of the national districts by drawing the exceptionally rich and diversified natural wealth of these districts into industrial exploitation, developing the industrial processing of local raw materials and establishing points of support for heavy industry.

The considerable increase in the sowing area of the so-called consumers' belt and of Siberia is a major factor entering into the geographic distribution of agricultural production under the Second Five-Year Plan, while under the First Five-Year Plan the eastern and southern districts showed the greatest increase in sowing area.

In the Second Five-Year Plan period the principal tasks for these districts consist in assimilating the area already under plough and striving for higher yield. Most of the increase in sowing area has been assigned to the districts in the consumers' belt where the area under crop is growing by 3,600,000 ha. (*i.e.*, 15.3 per cent) and to the districts in Siberia and the Far Eastern Territory where the rise is 2,200,000 hectares or 21.3 per cent.

The area sown to industrial crops in the Ivanovo Region, Northern Territory, East Siberia, the Far Eastern Territory and in Kirghizia is also increasing. In cotton production the role of Central Asia as the Soviet Union's principal cotton base is being enhanced, while at the same time the new cotton base in Transcaucasia is being consolidated.

In sugar beet production a new base is being established in the East with sharp increases in the proportionate output of West Siberia, the Far East, Transcaucasia and Central Asia.

The area under forage crops is being greatly extended, particularly in intensive stock-raising districts (Leningrad Region, Gorky Territory, Northern Territory and several other areas).

The large irrigation program mapped out for the Trans-Volga Area is beginning to be realized under the Second Five-Year Plan. Its purpose is to ensure stable wheat production in this area by locally draining the spring waters of small Volga tributaries for

the irrigation of 130,000 hectares of arable land and by completing the technical elaboration of the project for the general scheme of irrigation of the Trans-Volga Area.

The huge irrigation and amelioration projects contained in the plan for the principal districts growing sub-tropical industrial crops in Central Asia and Transcaucasia ensures the further specialization of these districts for the production of highly valuable industrial crops which utilize the soil and climatic conditions of these districts to best advantage.

Paramount and fundamental importance attaches to that part of the Plan which provides for the completion of the economic zoning of the country in connection with the establishing of a network of machine and tractor stations, which are to embrace the entire sowing area of the collective farms, are becoming the principal economic and political centres of the economic districts served by them and in which are being concentrated not only the technical base of agriculture but also the establishments for the processing of agricultural raw materials, the machine and repair shops and the power centres of the districts worked by the machine and tractor stations.

The geographic distribution of the industrial construction projected by the Second Five-Year Plan and the great expansion of agriculture in those areas which in the past used to depend upon the shipments of agricultural products from other districts are guarantees that the former division of the country into industrial and agrarian, into consumers' and producers' regions, is becoming entirely obsolete. The discharge of this task set by J. Stalin at the Seventeenth Congress of the Communist Party will be a great accomplishment in the establishment of a new, a more rational geographic distribution of the forces of production.

This in general is the characterization of the principal lines along which the geographic distribution of the productive forces of the principal branches of national economy is proceeding during the Second Five-Year Plan period. The following table shows the principal classes of construction and its apportionment among the most important areas: (See table, p. 412.)

The old districts—the Central Area and the Ukraine—which during the Second Five-Year Plan period are completing their vast schedule of construction begun under the First Five-Year Plan, absorb a great portion of the capital invested in national economy as a whole (36.2 per cent), especially of the capital invested in in-

CAPITAL INVESTMENTS IN NATIONAL ECONOMY
(Percentage of total for the U.S.S.R.)

Districts	All national economy	All industry	Heavy industry
Old industrial districts (Moscow, Leningrad, and Ivanovo Regions)	18.97	19.50	17.18
Ukraine	17.21	18.52	19.80
Volga districts	10.91	9.99	9.62
Ural-Kuznetsk Combination	21.37	25.37	28.98
of which:			
Urals	10.18	13.81	17.37
East Siberia and Far Eastern Territory	6.51	4.77	5.02
Transcaucasian S.F.S.R.	5.31	5.30	5.71
Central Asia	5.72	4.64	3.32

dustry (38 per cent). However, in industrial construction to be begun under the Second Five-Year Plan the percentage of the old areas recedes sharply (to 14.0 per cent) and the bulk of investments shifts to the new industrial districts of the Soviet Union.

The increasing industrialization of the new districts also becomes apparent from the proportion which new construction forms of the total capital invested in industrial construction. While the proportion of construction to be begun under the Second Five-Year Plan is 28 per cent [1] for the entire Soviet Union, for the old industrial districts of the Central Area this proportion is 19.8 per cent and for the Ukraine—14 per cent, while for the Volga districts it is 44.2 per cent, for East Siberia and the Far Eastern Territory—29.9 per cent, for Central Asia—49.9 per cent, for the Ural-Kuznetsk Combination where great construction operations were carried on during the First Five-Year Plan period and will be brought to a conclusion during the second quinquennial period, the percentage is 30.9, for Transcaucasia—24.8, etc.

The intensiveness with which the new districts are being industrialized is also evidenced by the structure of total capital investments in these regions. While the proportion which the amount of capital invested in industry throughout the Soviet Union forms of the total capital invested in national economy as

[1] Of the total capital invested in industrial construction, distributed according to districts.

a whole is 56.8 per cent,[1] the proportion which investments in the industries of most of the new districts (especially those in which new bases are being developed) form of the total capital there invested is considerably in excess of the average proportion for the entire U.S.S.R.: for the districts of the Ural-Kuznetsk Combination the proportion is 67.5 per cent, for the Urals—as much as 77.0 per cent, for Transcaucasia—57.7 per cent, etc.

The proportion, which investments in heavy industry constitute of the total investment in the industry of the new regions where new coal and iron bases are being established, is still more in excess of the corresponding figure (76.8 per cent) for the Soviet Union as a whole, being 86.3 per cent for the districts of the Ural-Kuznetsk Combination, 94.9 per cent for the Urals, 79.4 per cent for East Siberia and the Far Eastern Territory and 79.9 per cent for Transcaucasia. The proportion which investments in heavy industry form in the principal agricultural districts of the Soviet Union is also very great: in the Volga districts—72.6 per cent, in Central Asia—54.0 per cent, etc.

The new geographic distribution of industry and agriculture and the creation of new industrial centres considerably change the system constituted during the First Five-Year Plan period of lines of communication between the individual districts. The key task of the construction plan for the transportation system consists in the radical reconstruction and powerful development of the carrying capacity of the principal trunk lines connecting the Central Area with the South and East, the creation of new trunk lines affording outlets to the East and North-West, the construction of the most important sections of the second South Siberian trunk line, the establishment of new approaches to the Central Area from the north and east, the organization of powerful electrified transportation systems connecting the Donetz Basin with Krivoy Rog and serving the districts of the Ural-Kuznetsk Combination. While thus reconstructing and extending the main railroad lines in operation, the construction plan contemplates the building of a number of new lines of great importance for the economic development of the new districts. This construction includes the Pinyug-Syktyvkar and the Konosha-

[1] Industry's proportion is calculated in relation to total capital investments distributed according to districts. The proportion which investments in industry form of total investments in national economy as a whole is 49 per cent.

Velsk lines which afford an outlet for the timber areas of the Northern Territory; the Ufa—Sterlitamak line which connects Sterlitamak oil with the general transportation network of the Soviet Union; the Karaganda-Balkhash line which is to provide transportation facilities for the construction and exploitation of the giant Balkhash copper plant; the Rubtsovka-Ridder, the Temir Tay-Kondoma, the Tomsk-Chulym and a number of other lines. Of vast importance is the construction of the Lena railroad and of the Baikal-Amur trunk line, going far beyond the scope of the tasks to be accomplished under the Second Five-Year Plan. Building operations on these lines are being greatly developed under the Second Five-Year Plan. These lines are important factors in the plan for the economic assimilation and wide development of the productive forces in the districts of the Far East and the Far North-East.

New connections are likewise being established as a result of the vast construction provided for by the Plan in the field of waterway transportation. The opening to traffic during the first year of the Second Five-Year Plan period of the White Sea-Baltic Canal links up the Volga, its tributaries and the outlets to the Baltic and the White Seas thus forming a unified transportation route. The completion of the Volga-Moscow Canal is transforming Moscow, the greatest railroad centre of the Soviet Union, into a port directly connected with the biggest waterway thoroughfare of the country.

The building of the Volga-Don Canal provided for by the Plan is of exceptional importance. This construction project which links up the basin of the Soviet Union's principal water highway—that of the Volga—with outlets to the open sea creates a route for the transportation by water of the streams of coal and grain flowing from the Ukraine and the Northern Caucasus to the Central Area of the country and to the East, creates a channel for the most economical shipment of mass freight, particularly lumber consigned to the southern districts of the European portion of the U.S.S.R. This new trunk line will also be of great importance to export freight shipping.

With the construction of these new waterways the formation of a unified waterway transportation network for the European part of the U.S.S.R. connecting its principal river lines with the open seas will be completed.

The establishment of the Northern Sea Route—from the

White Sea to the Sea of Okhotsk through the Arctic Ocean—is of paramount importance for the development of the districts of the Far North and the inauguration of a new water route to the Far East.

The construction planned for transportation during the Second Five-Year Plan period lends strength to the series of measures adopted under the Second Five-Year Plan to effect such a new geographic distribution of the forces of production as will be in conformity with the task of completing technical reconstruction in national economy and will give rise to a system of economic districts in the plan of socialist construction. The main lines pursued by this geographic distribution are: a more even allocation of industry which will bring it into closer proximity to the sources of raw materials and power, the creation of new industrial centres which ensure the most efficient exploitation of the country's natural wealth, the specialization of agricultural regions and the establishment of large-scale agricultural production in what were formerly called the consumers' regions, the overcoming of the economic and cultural backwardness of the national districts and the reinforcements of the defensive strength of the country. The new geographic distribution of the forces of production solves one of the cardinal problems of the general program of building socialist society.

V

Construction during the First Five-Year Plan period presented problems that were new to the technique of building. The giant factories erected during the years of the first quinquennium, which required the application of high-class structural work, could not be built on the basis of the old technique of peasant building co-operative societies that characterized the technical level of construction of pre-revolutionary Russia and the first few years of economic construction in the U.S.S.R. This is precisely the reason why in the field of construction the First Five-Year Plan period witnessed the creation of a new branch of large-scale industry, the building industry, which year after year accumulated technical experience, skilled cadres and building machinery, and was thus able to solve most complicated problems arising in the designing and executing of construction projects at that time still unfamiliar to it. The road traversed in this regard is well charac-

terized by the following fact: while in 1929 the system of specialized building trusts carried out a construction program providing for 550,000,000 rubles' worth of building, which constituted 20 per cent of all building operations, in 1932 the value of the building operations carried out by the building industry and the large construction boards amounted to 7,000,000,000 rubles comprising 70 per cent of all construction proper. During these years the total construction machinery rose in value from 35,000,000 rubles to 250,000,000 rubles. Trained construction cadres—skilled workers, engineering and technical personnel—have expanded remarkably; the network of institutes engaged in scientific research on construction, and of engineering colleges, organizations engaged in design work, etc., has grown considerably. When the Soviet Union entered the Second Five-Year Plan period the task of creating a building industry that could rely on a powerful technical base, accumulate vast technical experience and cope with the particularly important construction problems arising under the Second Five-Year Plan had been accomplished.

Technical reconstruction in the building industry is an essential condition for the completion of reconstruction in national economy as a whole. The very scale of construction projected for the Second Five-Year Plan period makes a new construction technique and the further mastering of this technique imperative. While the fixed capital planned to be invested during the last year of the Second Five-Year Plan period represents a value of 32,000,000,000 rubles, construction proper comprises 18,300,000,000 rubles and equipment (free construction site) 10,600,000,000 rubles, and 3,100,000,000 rubles will be expended on the installation of equipment and miscellaneous work. It will be readily understood that to carry out such vast and in most instances exceedingly laborious construction and installation operations requires the most extensive mechanization of labour and the placing of building operations on a large-scale industrial basis.

It is a characteristic feature of building operations that the cycle of production is not repeated and that the object worked upon is territorially fixed. In industry technical reconstruction moves largely in the direction of introducing the conveyor system under which the subject matter of labour keeps moving while the means of production remain territorially fixed; but in the building

trades the central task of technical reconstruction consists in establishing a flexible and mobile system of means of production acting upon the subject matter of labour and creating a territorially fixed object. Therefore such problems as the organization of the construction site, the proper combination of mechanized and hand labour and the clear demarcation of preparatory from basic construction processes acquire prime importance in the construction industry. This signifies that the principal line which the reconstruction measures in the building industry must pursue consists in transforming construction into the assembling of prefabricated parts of buildings and items of construction turned out by factory or semi-factory methods, while at the same time introducing maximum mechanization of labour, primarily of the most laborious processes.

These guiding lines in technical reconstruction require first and foremost the extensive rationalization of structural parts used in constructional work. The increasing supply of iron and cement during the Second Five-Year Plan period makes it possible to initiate the increased use of these products. The Plan consequently provides for an increase in the reinforced-concrete type of construction from 14.9 per cent of all construction in 1933 to 18.8 per cent in 1937. This is to be accompanied by an increase in the proportion of stone construction, for which local materials will be used to a great extent. These provisions embodied in the construction program represent a long stride forward in the direction of introducing the assembly system in construction based on factory-made structural iron, standard concrete blocks for assembly, and the extensive use of prefabricated block construction.

While wooden and mixed structures show an absolute increase, the proportion which they form of the total volume of building constructed is declining.

Thus the proportion of wooden constructions is receding from 22.9 per cent in 1933 to 18.2 per cent in 1937; of mixed structures—from 6.2 per cent to 5.5 per cent.

This change in the composition of the building industry relative to the type of construction, and the gradual transformation of construction into processes of assembly make new demands upon the building materials industry and render imperative the vast extension of the network of auxiliary enterprises of the building industry which manufacture parts and semi-finished

products for this industry in the most rational form. The sum of 269,000,000 rubles is to be invested during the Second Five-Year Plan period in the construction of auxiliary establishments, which will make it possible for the latter to supply the various construction organizations with 30 per cent of all their requirements for prefabricated building materials.

Another trend of technical reconstruction in the building industry is the extensive mechanization of building operations, primarily of laborious operations. While during the First Five-Year Plan period considerable progress was achieved in this field by extensively mechanizing individual processes, the chief task set by the Second Five-Year Plan in this regard is the complete mechanization of construction operations, *i.e.*, such a combination of all mechanized processes and incident hand labour as will bring construction close to the highest form of large-scale industrial production—the continuous production process.

The plan for the mechanization of building operations as adopted contemplates the raising of the proportion of mechanized earth work to 70 per cent, of which by excavators—to 50 per cent, hydro mechanization—to 20 per cent; concrete mixing—to 95 per cent; stone crushing—to 90 per cent; horizontal transportation at construction site—to 80 per cent and stone quarrying by pneumatic hammers—to 90 per cent.

This considerable increase in the mechanization of laborious processes necessitates a vastly increased quantum of construction machinery. The value of the most important mechanical equipment is increasing by 439,000,000 rubles for the entire building industry during the Second Five-Year Plan period, of which 187,000,000 rubles are being allotted to the specialized construction trusts. While thus greatly increasing the total of available construction machinery, it is planned to raise considerably the coefficient of exploitation of this machinery. In contrast with the coefficient of exploitation for 1932 which was 0.20-0.25, the Plan provides for an increase in this coefficient to 0.65 for excavators, to 0.50 for concrete mixers, to 0.65 for stone crushers, to 0.65 for sorting machines, etc. The fulfilment of this task requires that the work at the construction site be organized with exceptional precision, that the various machines be properly placed and that the lack of planning and of organization which often characterized the use of machinery at construction sites at the beginning of the First Five-Year Plan period be resolutely combated.

The composition of the construction machinery available is undergoing a change in favour of an increased proportion of the more powerful and technically more perfect units, which results in a considerable rise in the technical level of the building industry.

The plan for the mechanization of constructional work as adopted for the second five-year period radically changes the character of construction operations; it places construction to a great extent on a large-scale, industrial basis. This process of transforming construction into large-scale industry is accompanied by a change in the very character of labour employed in construction: unskilled seasonal workers are being replaced by skilled workers operating machinery.

The fixed capital of the construction industry, which amounted to 476,000,000 rubles on January 1, 1933, is increasing to 1,108,000,000 rubles during the Second Five-Year Plan period, thus affording a powerful technical base for the reconstruction of the building industry. Supported by this base, the building industry, whose construction program embraces the most important sections of the entire construction plan for the second quinquennial period, is the leading factor, the paramount lever in the technical reconstruction of every sector of national economy.

The new technique in the building industry, the improvement in organization and in the quality of its management, make it possible to plan a decided improvement in the qualitative indices of this industry and a reduction in its production costs. As a result of the planned 75 per cent increase in labour productivity, the introduction of rational construction methods, the reduction in the cost of production of building materials and the greatest economy in their use for construction, the reduction in overhead expenditures and a number of other measures, it is planned to reduce production costs 40 per cent below the actual level of 1932, which is to constitute the principal task in the field of construction for the Five-Year Plan period. For industrial construction, costs are to be reduced 43 per cent, for housing construction—40 per cent, for agricultural construction—35 per cent, for transportation construction—36 per cent, for municipal construction—38 per cent. The national economic significance of the fulfilment of this task is characterized by the fact that the saving effected by lowering construction costs will for 1937 alone

amount to the enormous total of 8,700,000,000 rubles, which is equivalent to almost one-half of the total capital invested in national economy in 1932. Building organizations and the agencies which regulate construction must concentrate attention particularly on the accomplishment of this task. This in turn depends primarily on the struggle to be waged to master the new technique of the building industry, depends on the proper organization of work at the construction sites and on concrete technical guidance in constructional work. The technical equipment of the building industry and the building experience accumulated during the years of the First Five-Year Plan period are bringing into being all the conditions necessary for the solution of this problem.

LABOUR, CADRES AND LIVING CONDITIONS

I

THE central task of the Second Five-Year Plan in the sphere of labour consists in effecting a considerable increase in the productivity of socialist labour, in strengthening socialist labour discipline, solving the problem of cadres and decidedly raising the material and cultural standards of the workers and peasants.

Labour productivity must be increased by 63 per cent in large-scale industry, by 43 per cent in railway transportation, 86 per cent in waterway transportation, 75 per cent in construction and 146 per cent on the State farms under the People's Commissariat of State Farms. On this basis it is planned to effect a 2-fold increase in real wages.

The number of workers and employees is to rise 26 per cent under the provisions of the Second Five-Year Plan.

The total wage fund is to increase by 18,000,000,000 rubles, *i.e.*, by 55 per cent, in comparison with 1932; the average wages of workers employed in large-scale industry are to rise 25.4 per cent, and wages in the national economy as a whole—23 per cent.

The funds assigned for cultural service and for the improvement of living conditions of non-agricultural workers are increasing from 4,300,000,000 rubles to 9,300,000,000 rubles—a 2.2-fold increase.

The available housing space (taking into account the space discarded) is increasing by 61,400,000 sq. metres. The sum of 12,500,000,000 rubles is being expended for new urban housing construction and dwelling space reserved for the workers of particular factories.

For the reconstruction of municipal services in cities, 6,900,000,000 rubles have been assigned.

The sum of 19,600,000,000 rubles has been appropriated for public health.

Expenditures for the training of cadres for the whole of national economy total 24,400,000,000 rubles. The public catering system is being extended to include 52,500,000 toilers of town and country.

* * *

According to the Plan, labour productivity is increasing 75 per cent in heavy industry (People's Commissariat of Heavy Industry), 52 per cent in light industry (People's Commissariat of Light Industry), and 60 per cent in the food industry (People's Commissariat of Supply) and in the timber industry (People's Commissariat of Timber).

In order that the projected rates of increase in labour productivity may be fully appreciated, it must be noted that while in the First Five-Year Plan period every per cent of growth in labour productivity within the systems of the four industrial People's Commissariats (exclusive of timber cut) yielded an increase in output equivalent to 232,000,000 rubles (in fixed 1926-27 prices), during the Second Five-Year Plan period 1 per cent of increase in labour productivity is equivalent to an increase of 396,000,000 rubles in output. Of the 38,700,000,000 rubles representing the increase in output of these People's Commissariats in 1937 as compared with 1932 (exclusive of timber cut), 26,400,000,000 rubles will be accounted for by increased labour productivity.

In construction the Plan provides for a 75 per cent increase in labour productivity. This formerly backward branch of national economy with its semi-handicraft methods of organization of labour assumed the character of a distinctly large-scale industry during the course of the First Five-Year Plan period. In the second period the building industry is witnessing a considerable increase in its technical equipment, while at the same time decidedly improving the utilization of the available machinery.

In railway transportation a 43 per cent increase in labour productivity has been planned (labour productivity being calculated in ton-km. per person employed, reduced to a common basis of comparison).

The increase in labour productivity for the various departments of the waterway transportation system has been set at 86 per cent (in ton-km., reduced to a common basis).

The volume of turnover per person employed in the trading system is to exhibit an increase of 54.3 per cent.

In the public catering system the output per person employed calculated according to the number of dishes served per person employed in this system) is rising 50 per cent.

The increased mastery of the new technique and the improved

utilization of the new plants ensures a particularly high rate of increase in labour productivity at the new enterprises. Thus, in the iron and steel industry the 100 per cent average increase in labour productivity is to be attained by a 3-fold increase in that of the new machine aggregates and a 72 per cent increase in the old units.

In the coal industry labour productivity must be 70 per cent higher for the new pits than the old pits which will not have been reconstructed by 1937.

The completion of technical reconstruction in national economy, the mastery of the newly created material and technical base according to plan, the strengthening of socialist labour discipline, the rising proportion of skilled cadres in national economy and the radical improvement in the welfare of the toiling masses furnish all the conditions necessary to raise labour productivity to the extent projected.

The training of the necessary cadres is the decisive condition for improving labour productivity. The specifications of the Plan in this field are so comprehensive that fulfilment of the tasks assigned by the Plan will signify the solution of the problem of technical cadres during the Second Five-Year Plan period.

While quite a number of old professions requiring hand or unskilled labour (barrow men, pig casters, etc.) are becoming extinct a considerable number of new professions requiring a knowledge of modern technique are making their appearance. Instead of workers engaged in work requiring great physical exertion, cadres of trained and skilled workers capable of operating complex modern machinery are being formed.

Success in the mastery of technique is to a great extent determined by the qualificational composition and level of skill of the workers. During the First Five-Year Plan period there was an influx into industry of 300,000 skilled workers who had graduated from factory vocational schools, while the influx of such workers into national economy as a whole totalled 450,000.

During the Second Five-Year Plan period the factory vocational schools functioning in industry are to graduate 1,700,000 skilled workers, while for the whole of national economy the number of such graduates has been set at 2,500,000. Besides, more than 2,000,000 workers are expected to graduate from other schools and stationary courses of mass training of qualified workers.

The drawing into production of 5,000,000 additional workers who have received mass training for skilled work, coupled with the attendance of tens of millions of workers and collective farmers at various kinds of courses considerably raises their degree of skill and thus ensures the most rapid mastery of technique and the best utilization of the new, technically advanced equipment.

Another force acting in the same direction is the relative increase in the number of skilled specialists in all branches of national economy. The army of Soviet specialists in the whole of Soviet economy is growing from 2,737,200 persons in 1932 to 4,009,900 persons in 1937, a 46.5 per cent increase. As a result, the relative number of specialists employed in the most important branches of Soviet industry will exceed the proportion so employed in Germany: in the coal industry, specialists will constitute 6 per cent of the total number of employees in 1937 (in Germany—4.2 per cent); in the iron and steel industry—10.5 per cent (in Germany —6.2 per cent); in machinery production—12.8 per cent (in Germany—9.8 per cent).

The better utilization of working hours is an important factor in securing increased output per worker during the Second Five-Year Plan period.

It is contemplated to increase the average annual number of days worked in industry from 257 days in 1932 to 267 days in 1937. This is to be accomplished by eliminating unexcused absences (in 1932, about 6 days were lost per worker due to unexcused absences) and by reducing the number of excused absences, which is to be effected by considerably improving the living conditions of the workers.

The outlined measures designed to improve the medical, cultural and social services extended to the workers are having the effect of reducing the number of absences due to temporary disability from 14.26 days for industrial workers in 1932 to 10 days in 1937.

The better organization of labour and the improved planning of production processes must also conduce to the almost complete elimination of stoppages, bringing the maximum for 1937 down to 0.5 days per worker per year.

In order that the tasks assigned in the field of raising labour productivity during the Second Five-Year Plan period may be fulfilled, excessive labour turnover must be abolished. This is to

be achieved by introducing graduated wage schedules and giving preferential treatment to leading trades, by systematically promoting workers who have become conversant with the technique of their work to positions requiring greater skill, by enhancing the technical skill of the workers and systematically improving their material and social conditions.

The partial elimination of seasonal work in a number of industrial branches and the lengthening of the working season in those branches in which production is still not carried on throughout the entire year (the sugar, peat, building and other industries) create additional possibilities for raising labour productivity on the basis of the improved utilization of equipment and the formation of permanent cadres of workers.

The abolition of excessive labour turnover and the steady attachment of workers to their respective enterprises brings with it an increase in the length of vacations. While in 1932 the average vacation was 15 days, in 1937 it will be extended to 17 days.

Socialist competition and shock brigade work—new forms of social labour—are important factors in raising the productivity of labour.

In 1932 three-fourths of all workers were engaged in socialist competition and shock brigade work, and about one-third of the workers were enrolled in cost accounting brigades—the highest form of socialist competition.

During the Second Five-Year Plan period every worker ought to be drawn into socialist competition, and the struggle to set up a new, socialist labour discipline, to raise labour productivity, to reduce production costs, to master technique and improve the quality of output must be developed on a still wider front.

In remoulding the worker himself, socialist competition paves the way for the conditions which lead to the abolition of the distinction between mental and physical labour.

The new forms of socialist labour are developing more extensively also in agriculture among the State-farm workers and the collective farmers.

The organizational changes that are being made by the Communist Party and the Government during the first years of the Second Five-Year Plan period in the management of production are bound to play an exceptionally great role in raising the labour productivity of all branches of national economy.

The entrenchment of the principle of one-man management, the abolition of superfluous administrative gradations, the transfer of specialists directly to places of production, to the shops, the increased importance of the foreman and the reference of all labour organization, technical rate-fixing and wage questions directly to the technical head of the shop or factory for decision must result in a radical qualitative improvement of concrete organizational, technical and economic guidance.

The decided improvement in every phase of the socialist organization of labour, the termination of its trailing behind the increased demands of socialist construction, the elimination of every manifestation of depersonalization in the organization of labour, particularly of the so-called functional system, and of all traces of equalitarianism in framing the system of wages, the discontinuance of rush work methods and of work done by fits and starts, the proper organization of technical rate-fixing, the extensive application of the piece-work system (including progressively higher rates for output above the production standard), and the award of bonuses are the chief conditions for the realization of the outlined increase in labour productivity.

The growth of labour productivity in the most important branches of national economy is characterized by the following data.

While the value of the output per worker in the iron and steel industry is increasing 100 per cent, the volumes of output expressed in physical quantities have been set for the most important departments as given below:

In the blast furnace departments taken as a whole the output per worker is increasing from 255 tons to 710 tons or by 178.4 per cent, and to 2,010 tons in the new plants.

In the open-hearth furnace departments the output per worker is increasing from 155 tons to 407 tons, or by 162.6 per cent; in the rolling mill departments—from 92.0 tons to 227.0 tons, or by 146.7 per cent.

An 85 per cent increase in labour productivity has been projected for the machinery industry. This rate of increase is being assured first and foremost by the increasing technical equipment at the disposal of the workers, by the sharp proportionate growth of large-scale mechanized production and the shorter time required for the mastery of new plants. The change and improvement in

technological processes is a very important factor in raising the productivity of labour.

The output per person employed in the coal industry is reaching 26.3 tons of coal per month during the Second Five-Year Plan period in comparison with 13.8 tons in 1932, which is equivalent to a 91 per cent increase. The following are the labour productivity increases specified for some of the most important coal basins:

Basins	Productivity per person employed (tons)		1937 in % of 1932
	1932	1937	
Ukrainian Donetz Basin	12.9	23.9	185
Northern Caucasus Basin	13.3	25.0	188
Moscow Basin	16.1	30.0	186
Ural Coal Trusts	13.3	28.5	214
Kuznetsk Basin	21.2	33.0	156

The projected increase in average labour productivity takes into account the changes in the coal output of the several districts by the end of the Second Five-Year Plan period. This regional factor alone accounts for an increase of 12 per cent in labour productivity. Consequently, the completion of mechanization of production processes and factors organizational in character make it possible to effect an increase of approximately 80 per cent in the productivity of labour.

In the cotton-goods industry the Plan provides for a 48 per cent increase in labour productivity expressed in value. The output per thousand spindles is increasing by 14.2 per cent (from 289 kilo-numbers to 330 kilo-numbers), while the labour power consumed is being reduced by 23.7 per cent (from 7.86 persons per thousand spindles in 1932 to 6 persons in 1937). In spinning the physical output per worker is rising 53.1 per cent (from 35.93 kilo-numbers per hour in 1932 to 55 kilo-numbers per hour in 1937). In weaving, labour power expenditure is being reduced from 43.4 persons per 100 looms in 1932 to 31.4 persons in 1937 (a 27.7 per cent drop). In weaving, the physical output per worker per hour is undergoing a 53.3 per cent increase (from 7.5 metres to 11.5 metres of unbleached fabrics).

In the woollen-goods industry, a 60 per cent increase in labour productivity expressed in value has been provided for by the Plan. In French spinning the output per thousand spindles is increasing

49.8 per cent (from 347 kilo-numbers to 520 kilo-numbers), while labour power expended is being reduced 22.9 per cent (from 29.7 persons per thousand spindles in 1932 to 22.9 persons in 1937). Expressed in physical quantities the output per worker is rising 94.2 per cent (from 11.69 kilo-numbers per hour in 1932 to 22.7 kilo-numbers in 1937).

The 60 per cent increase in labour productivity in the food industry is based on the mastery of the great volume of new fixed capital with which operations were started during the First Five-Year Plan period, as well as on the subsequent opening for exploitation and additional construction of enterprises equipped with the most modern machinery.

The 43 per cent increase in labour productivity projected for the railway transportation system is based on the reconstruction of transportation to be accomplished during the Second Five-Year Plan period, the mechanization of quite a number of laborious processes in which automatic machinery is to be introduced and the reorganization of the work of the transportation system to conform with the decisions of the Central Committee of the Communist Party and of the Council of People's Commissars.

The introduction of automatic brakes considerably reduces the number of brakemen required per train crew (while the number of brigades is growing simultaneously). The average freight train crew is to consist of 2.5 persons in 1937 as against 4.3 persons in 1933.

The introduction of high-powered steam and electric locomotives sharply increases the monthly standard runs of crews.

By equipping part of the steam locomotive stock with mechanical stokers and introducing new powerful steam locomotives, a reduction in the average steam locomotive crew is being secured.

The introduction of mechanical fuel feed on steam locomotives, the extensive application of the principle of simultaneous operations, *i.e.*, the simultaneous taking on of fuel, water, sand, lubricants, etc., and the mechanization of turntables, etc., reduces the time spent by the engine crew in supplying the engine from 6.4 hours to 4.5 hours.

In waterway transportation the projected 86 per cent increase in labour productivity for the present Five-Year Plan period is to be achieved by reconstructing the maritime and river fleets, by improving the organization of work on shore as well as on board

ship, by providing better equipment for waterways, by extensive harbour construction and introducing new methods for the exploitation of the fleet.

In river transportation a 55.4 per cent increase in labour productivity has been mapped out for the floating units of the transportation fleet. Labour productivity of the floating units of the maritime transportation fleet is to increase 80 per cent.

Considerably increased labour productivity during the Second Five-Year Plan period is a prime condition for the lowering of production costs in all branches of national economy, determining as it does the enormous rise in consumption by the toiling masses and in socialist accumulation.

II

The solution of the problem of creating a proletarian technical intelligentsia, the training of mass cadres of skilled workers, is a paramount condition of the accomplishment of the tasks of completing technical reconstruction in national economy, of the mastery of the new technique and of the fulfilment of the plan to raise labour productivity.

The plan for the supply of specialists to Soviet national economy during the Second Five-Year Plan period provides for an increase in the total number of specialists from 2,737,200 to 4,009,900. At the same time the composition of the body of specialists is to undergo considerable change both from the social aspect (most of the new forces are to be drawn from the working class and the collective farmers) and the degree of qualification. The proportion of specialists who are graduates of special training courses in colleges or middle schools is rising from 49.9 per cent in 1932 to 57.9 per cent in 1937, and the absolute number of these cadres is growing from 1,400,000 persons in 1932 to 2,300,000 persons in 1937. Still greater progress in improving the qualifications of specialists at work is planned for industry, transportation and agriculture. While in industry the number of specialists is increasing from 331,300 in 1932 to 520,000 in 1937 (a rise of 57.0 per cent), the number of graduate specialists is multiplying almost 2.5-fold. In transportation and communication it is planned to increase the number of specialists by 63.2 per cent which includes a 3.3-fold increase in the number of those who have completed a course of special education. Agriculture is to exhibit the greatest

increase in specialists: in this field the number of specialists at work is doubling, reaching 425,000 in 1937, while the number of specialists who have been given a complete course of special training is multiplying 3.5-fold.

This considerable augmentation of specially trained cadres engaged directly in production is to be secured under the Second Five-Year Plan by a 2 to 3-fold increase in the number of graduates from special schools, and by the introduction of a new system of utilizing young specialists according to which every college and middle technical school graduate must start work in the lower links of the industrial chain (factory department, pit, workshop, section).

The total number of specialists in all departments of cultural development (schools, pre-school institutions, institutions for the training of cadres, institutions for political enlightenment, the press and art) is increasing from 1,100,000 in 1932 to 1,500,000 in 1937. The number of college and secondary school graduates among cultural workers is multiplying 1.5 times.

In public health the medical personnel of university and secondary school training, exclusive of crèche nurses, is increasing by 42 per cent during the period of the Second Five-Year Plan reaching a total of 400,000 persons in 1937. The number of physicians is rising from 76,300 in 1932 to 97,000 in 1937.

The need to improve the scientific and technical qualifications of the cadres at work, the direct result of the entire program for the completion of reconstruction in national economy, calls for substantial alterations in the system of training cadres during the Second Five-Year Plan period.

In training cadres of executives in the economic field Communist Agricultural Colleges are being developed alongside of Economic Academies organized during the First Five-Year Plan period. These agricultural schools train cadres, rendering them politically developed and conversant with scientific farming so that their graduates may be competent to act as executives in lower units of agricultural production.

Engineering academies—new establishments representing the highest type of institution for improving the scientific qualification of specialists at work—are being set up during the Second Five-Year Plan period.

Universities—the highest schools for training scientific and pedagogic cadres in all subjects of general science—are being

organized within the confines of all Union republics thus ensuring a uniform system of training scientific workers.

The central task with regard to the colleges and middle technical schools consists in consolidating the existing network of educational institutions. This must find expression in the establishment of more precise specialization, the introduction of fixed curriculums and programs, the use of standard textbooks, the organization and extension of auxiliary establishments such as laboratories, students' workshops and experimental farms. As a result of the increased importance attached to general scientific and technical courses in the curriculums of the technical educational institutions, the students are made conversant with all the principal achievements of world science and technique. Supplying colleges and middle technical schools with highly skilled cadres of instructors must become an important factor in raising the grade of these educational institutions.

The object of the system of extension courses is undergoing a change during the Second Five-Year Plan period. During the first quinquennial period the need to increase the number of qualified persons made it necessary to supplement the poorly developed network of stationary educational institutions by the addition of various short-term schools and courses for the training of specialists. During the second period, at the beginning of which a great number of colleges and middle technical schools were established, the systematic improvement of the scientific and technical training of cadres at work, in the first place of the great number of people with practical experience but no formal education and of persons who have not received a complete special education, must become the principal task assigned to the system of extension courses for specialists.

The factory vocational schools are becoming trade schools for those who have gone through incomplete secondary school courses. Due to the fact that entrance requirements to the factory vocational schools have been raised and the system of training has been changed, the length of the factory vocational school courses has been fixed at from 6-12 months depending upon the complexity of the profession.

In order to train technically skilled workers for the mechanization of agriculture, workers who not only can operate machinery but are also capable of maintaining and keeping in current repair the principal prime movers used in agriculture, a system of schools and courses is being established for tractor drivers, combine

operators, chauffeurs, tractor brigade leaders and mechanics.

The task of strengthening the collective farms organizationally and economically makes it necessary to train brigadiers for field work (in stock-raising—stock-raising brigadiers) who must have an adequate training in scientific farming. These brigadiers represent a new type of master of agricultural production who has to organize and direct the important lower links of large-scale agricultural enterprises. Accordingly, the cadre plan for the Second Five-Year Plan period provides for the establishment of district collective farm schools—mass schools training brigadiers as well as other skilled agricultural workers on a mass scale.

The development of State-farm schools, a type of factory vocational school in the field of agriculture, must proceed in the direction of training skilled cadres for repair work, operators for complicated farm machinery, skilled workers taken from field-work and stock-raising brigades.

Owing to the rapidly growing use of motor vehicles in the U.S.S.R. the Plan provides for the establishment of permanent schools and courses for the training of chauffeurs. They will differ from the factory vocational schools in that entrants may not be less than 18 years of age and instruction is to be differently organized.

The creation of so developed a system of cadre training on a mass scale makes it possible to use the system of extension courses training workers and collective farmers for the purpose of satisfying the most important demands of production by systematically improving qualification and mastering modern technique. Imparting the obligatory technical minimum to the workers constitutes a pivotal task in this domain.

The consideration underlying the entire system of cadre training under the Second Five-Year Plan is the need to master technique as quickly as possible, to ensure a rise in the cultural level of the broad masses of workers and collective farmers and to improve the scientific and technical knowledge of the Soviet intelligentsia.

The plan for the training of specialists during the Second Five-Year Plan period contemplates an increase in the network of educational institutions, primarily in the new industrial districts and the national republics and regions, a further systematic augmentation of student enrolment in all gradations of vocational and technical education, being guided in this respect by the direct instructions of the Seventeenth Conference of the Communist Party that "the

numerical increase of technical cadres in the Soviet Union must not in the least lessen the importance of the problem of their scientific qualification, of the paramount need of these cadres to master, accordingly, all the principal achievements of world science and technique."

In the economic academies the student body during the Second Five-Year Plan period must be increased from 8,200 in 1932 to 12,900 in 1937 (a 57.3 per cent increase). It is planned during the five years to enrol 17,200 students at academies and to graduate 8,500. Most of the graduates (5,100) will come from the industrial academies.

The student enrolment for the Communist Agricultural Colleges is to increase from 22,500 in 1932 to 40,200 in 1937—a 78.7 per cent increase. These colleges during the Second Five-Year Plan period are supplying 63,200 Communist Party and Young Communist League district workers, directors of machine and tractor stations, managers of departments and sectors of State farms and managers of collective stock farms. A total of 93,200 students are entering these colleges during the Second Five-Year Plan period.

While the increase in the network of colleges and middle technical schools is confined to 10 per cent, the total number of students to be enrolled is increasing 40-43 per cent. This is being effected by enlarging the individual educational institutions established in great number during the course of the First Five-Year Plan period. The following table indicates the increasing contingents assigned to colleges, technical colleges and middle technical schools, classified according to the most important branches of national economy:

Branches of national economy	Numbers of students (thousands)				1937 in % of 1932	
	Colleges		Middle technical schools		Colleges	Middle technical schools
	1932	1937	1932	1937		
Total	469.8	660.6	797.0	1,140.1	140.6	143.0
of which:						
Industry	180.5	197.4	212.6	261.4	109.4	122.9
Transportation and communication	46.0	48.1	103.3	126 2	104 6	122 2
Agriculture	62.2	105.7	150 6	196 8	169 9	130 7
Education	93.5	160.5	192.1	323 0	171 8	168 1
Public health	46.4	90.0	59.3	121 2	194 0	204 4

During the years of the Second Five-Year Plan period national economy is being supplied with 1,488,700 new specialists who have graduated from special schools (8,500 from academies, 63,200 from Communist Agricultural Colleges, 336,300 from colleges, 850,500 from middle technical schools, and 230,200 from Communist Colleges and Soviet and Communist Party schools).

In comparison with the First Five-Year Plan period, this cadre plan maps out considerable increases in the number of graduates from colleges, technical colleges and middle technical schools.

Instead of the 170,700 specialists graduated from colleges during the First Five-Year Plan, it is contemplated to graduate 336,300 specialists during the second quinquennial period. The 308,900 graduates of middle technical schools are to increase during the Second Five-Year Plan period to 850,500.

Inasmuch as during the Second Five-Year Plan period a resolute struggle is being waged to improve the quality of instruction, the proportion which college and middle technical school graduates form of the total number of persons receiving instruction is to grow systematically. Thus, the 1932 college graduates constituted only 11 per cent of the total student body at the beginning of the year. In 1937 they will constitute 17.6 per cent of the total number of students. The proportion of middle technical school graduates is increasing from 14 per cent in 1932 to 22.8 per cent in 1937.

Branches of national economy	Graduates from colleges and technical colleges (thousands)			Middle technical school graduates (thousands)			Middle technical school graduates per hundred college graduates	
	For the 4 years of 1929-32	For the five-year period 1933-37	Second five-year period in % of first five-year period	For the 4 years of 1929-32	For the five-year period 1933-37	Second five-year period in % of first five-year period	First five-year period	Second five-year period
Industrial cadres [1]	69.0	145.6	211.0	104.9	298.7	284.7	152.0	205.2
Agricultural cadres	28.8	53.5	185.7	57.0	152.7	267.9	197.9	285.4
Education . .	40.2	77.5	192.8	89.8	246.9	274.9	223.4	318.6
Public health . .	20.5	33.7	164.4	38.8	100.3	258.5	189.3	297.6
Miscellaneous [2] . .	12.2	26.0	213.1	18.4	51.9	282.1	150.8	199.6
Total	170.7	336.3	197.0	308.9	850.5	275.3	181.0	252.9

[1] Industry, transportation and communication, handicraft co-operative organizations and municipal services.

[2] Inclusive of socio-economic cadres (trading, planning, finance, Soviet construction and law) and physical culture cadres.

During the Second Five-Year Plan period up to 5,000,000 workers who have received a mass training are to acquire a supplementary education in stationary schools of various forms.

Of the newly-trained cadres, 1,700,000 skilled workers are being assigned to industry as against 300,000 so assigned during the First Five-Year Plan period. Agriculture is being supplied with up to 1,500,000 tractor drivers and combine operators, brigadiers, repair workers and other workers who have received a mass training for skilled work, while more than 1,000,000 persons, including 700,000 chauffeurs, are being allotted to the transportation system.

The material base for the training of cadres is undergoing considerable expansion in accordance with the planned development of stationary educational institutions training cadres, and the instruction imparted to millions of workers and collective farmers in various circles and courses for improving qualification.

Expenditures (operating expenses and capital investments) for the whole of national economy for the purpose of training cadres total 24,400,000,000 rubles for the Second Five-Year Plan period.

III

The Plan provides for a 26 per cent increase in the number of proletarians employed in national economy as a whole during the Second Five-Year Plan period, and for a 26.2 per cent increase in the non-agricultural branches.

In large-scale industry the number of workers and employees is to increase 29 per cent. Under the Second Five-Year Plan great changes are taking place in the correlation between the various groups of workers in the direction of an increase in the proportion of workers directly engaged in production, of a greater percentage of engineers and technicians and a smaller percentage of employees. In consequence the personnel employed in industry is undergoing the following structural changes (in percentages of total):

	1932	1937
Workers	74.1	78.2
Employees	8.2	6.2
Engineers and technicians	5.2	6.4
Junior service personnel	4.8	4.9
Apprentices	7.7	4.3 [1]
Total	100.0	100.0

[1] The percentual decrease in apprentices is explained by the change in the system of instructions

The number of workers and employees in the building industry is to increase 9.6 per cent as against 1932. An increase in the percentage of workers, engineers and technicians directly engaged in production and a reduction in service staffs and employees has been projected for the building industry also. The Plan maps out the following structure for the building trade personnel:

	1932	1937
Workers	79.3	83.0
Employees	7.3	4.7
Engineers and technicians	4.8	5.7
Junior service personnel	7.1	5.5
Apprentices	1.5	1.1
	100.0	100.0

The increase in railway transportation personnel has been set at 9.1 per cent and in waterway transportation personnel—at 17.6 per cent. The marked growth of the number of motor vehicles—passenger cars, trucks and busses—the rapid development of civil aviation and the great increase in street car traffic necessitate a 76 per cent augmentation of the personnel in the categories of transportation indicated.

The 58 per cent increase in the number of persons employed by the public health service and the 53 per cent increase in the number of those employed in education—rates of increase considerably in excess of those applying to most of the other branches of national economy—are in consonance with the projected extension and improvement of the medical and sanitary service for the toiling masses and the projected expansion of educational work.

The Plan for the second five-year period provides for a 20 per cent reduction in the number of employees in the administrative and managerial apparatus. The points of departure for this reduction are the need to simplify the State apparatus, the mechanization of laborious accounting and other operations and the drawing of the working masses into participation in the work of the State apparatus (workers working simultaneously in factories and in the State apparatus).

All the measures outlined conduce to a change in the distribution of the proletariat throughout the various branches of national economy. This change, an expression of the increasing productive consumption of labour power, is characterized by the following data:

	1932	1937
Industry	34.7	35.3
Construction	13.6	11.9

	1932	1937
Agriculture	12.5	12.4
Transportation and communication	10.7	10.8
Circulation	6.7	8.4
Social welfare services	13.8	16.2
Administration	8.0	5.0
Total	100.0	100.0

The industrial proletariat is increasing in proportion from 34.7 per cent in 1932 to 35.3 per cent in 1937. The proletariat engaged in the various branches of social welfare service is increasing proportionately from 13.8 per cent in 1932 to 16.2 per cent in 1937.

The sharp increase in commodity circulation and the improvement in the quality of service to consumers involves a proportionate increase in the number of proletarians employed in circulation of from 6.7 per cent in 1932 to 8.4 per cent in 1937. There is a simultaneous sharp decrease in the proportion of employees in the administrative apparatus of institutions (from 8 per cent in 1932 to 5 per cent in 1937).

As a result of the increase in labour power projected for individual branches of national economy, the total number of workers and employees (exclusive of apprentices) in national economy as a whole (computed as of the end of the corresponding year) is increasing by 6,500,000. The total increase in the number of workers and employees constitutes 7,100,000 persons which takes into account a reduction of 600,000 employees in State institutions, industry and transportation. But the amount of labour power required by national economy is determined not only by the general increase in the number of workers and employees but also by the need to replace the 3,400,000 persons who will cease to be employed during the five years due to death, disability, enrolment for study, etc. Consequently the total supplementary labour power required in all branches of work during the five years has been set at 10,500,000 persons.

The supplementary labour power required is being procured from the following sources:

1) Factory vocational school graduates, construction workers' schools and State farm schools are supplying 2,700,000 workers (25.7 per cent of the entire number required)[1];

[1] In addition to the factory vocational school graduates referred to, national economy is being supplied with over 2,000,000 trained workers who have gone through collective farm, chauffeur, combine operator and other schools.

2) Graduates of middle technical schools, colleges, technical colleges, academies, Communist Colleges and Soviet and Communist Party schools are furnishing about 1,500,000 specialists of secondary and college training (14.1 per cent of the total requirement);

3) The drawing upon adult female members of the families of workers and employees provides for 1,300,000 persons (12.4 per cent of the total requirement);

4) The utilization of employees whose services have become available by the reduction of the administrative apparatus accounts for about 600,000 persons (5.6 per cent);

5) Drawing upon the urban youth who have finished complete secondary school courses or incomplete secondary school courses and miscellaneous urban sources yield 1,200,000 persons (11.3 per cent);

6) Finally, about 3,200,000 workers (30.9 per cent of the total requirement) are being secured by the organized enrolment of labour power in the rural districts (on the collective farms).

Every one of these sources of supply reflects the socialist character of cadre reproduction in the U.S.S.R. By creating its own proletarian intelligentsia, by training cadres comprising millions of skilled workers who have gone through polytechnic schools, by continuing to draw women into production, securing work for all those released on account of the reduction of the administrative apparatus and finally by drawing upon the workers of the countryside in an organized fashion, the cadre procurement plan ensures the solution of the problem of training cadres for the completion of technical reconstruction throughout the country during the Second Five-Year Plan period.

Women continue to be drawn into production on an increasingly wide scale during the period of the Second Five-Year Plan. The influx of women has been set at more than 3,000,000 for the whole of national economy (1,300,000 women are to be taken into production from the category of housewives—members of families of workers and employees; the remaining 1,700,000 women are to be accounted for in part by factory vocational school, college and middle technical school graduates, in part by female collective and individual farmers drawn into the cities from rural districts in an organized fashion).

The process begun during the First Five-Year Plan period of constantly improving the skill of female workers, of placing them

on a wide scale in various responsible positions and in leading professions of industry, transportation and construction is showing rapid development during the course of the Second Five-Year Plan period. The entire technical policy and socialist rationalization of industry and other branches of national economy, which is bound up with the extensive mechanization of production and the radical hygienic improvement of working conditions, lead to a state where women receive every opportunity to discharge functions in production requiring the most varied degrees of skill without the slightest impairment of their health.

To make possible the regular influx of skilled female labour power during the Second Five-Year Plan period, women are to be drawn in great numbers into factory vocational schools, middle technical schools, colleges and technical colleges. The measures which are being extensively applied during the Second Five-Year Plan period in the hygienic rationalization of production processes and in industrial sanitation, and which are creating the healthiest working conditions possible for working women and an entire system of social welfare measures—the inclusion of 52,500,000 persons in the public catering system (a 2.5-fold increase), the 2.6-fold increase in the number of crèche accommodations in the cities, the 3-fold increase in the number of children in pre-school institutions, etc.—constitute the essential prerequisites for the still more widespread participation of women in production.

IV

On the basis of the general growth of the country's productive forces and the increase planned for labour productivity, a further rise in real wages has been contemplated for all branches of national economy and cultural development in the U.S.S.R.

Real wages, or the total physical volume of goods consumed per capita by the workers and employees (in non-agricultural lines of work) are increasing 2-fold on the average during the Second Five-Year Plan period when compared with 1932. The index of the physical volume of food consumed in 1937 by the workers and employees will constitute 202.2 per cent of that consumed in 1932 (in fixed 1932 prices). The index of the physical volume of manufactured articles of general consumption consumed in 1937 will constitute 207.6 per cent of that consumed in 1932.

The realization of the planned increase in real wages makes necessary the adoption of a system of wage payments that will stimulate to the utmost the personal interest of each worker in raising labour productivity, eradicating stoppages and other shortcomings in the organization of labour, in establishing such forms and systems of payment as will encourage working directly in the shops, sectors or elsewhere in production, as will strengthen labour discipline, ensure the quickest possible abolition of labour flux and secure improved skill and the mastery of technique. This objective of the Plan is best attained by the piecework system which is to be supplemented in the decisive sections of national economy by the granting of bonuses (the so-called progressive bonus piecework system and other systems).

The consistent application of the socialist principle of distribution according to labour performed must have the effect of raising real wages in the leading production branches and professions considerably above the average wage. The high rate of increase in physical volume of per capita consumption is likewise paralleled by:

a) A considerable increase in the monetary incomes of workers and employees;

b) A reduction in prices;

c) A vast increase in gratuitous services received by workers and employees through cultural and social service channels (the so-called "socialized wages").

During the course of the five years the per capita monetary income of workers and employees, taken as a whole, is increasing by 37 per cent. The basis for this monetary increase is supplied by:

a) The further rise in the number of persons that are employed per working class family; the increase in the number of scholarship holders and pensioners and a consequent decrease of 10 per cent in the number of dependents per person employed (a drop from 1.08 in 1932 to 0.97 in 1937);

b) The rise in the nominal individual wages (amounting to 23.0 per cent for the workers and employees as a whole and to 25.4 per cent for industrial workers) to correspond to the increasing skill of the workers and the increasing proportion of highly trained workers and specialists;

c) The increase in the monetary income of workers and employees derived from the country's financial system (State loan prizes and repayments).

On the basis of the planned increase in the average individual wages and in the number of workers and employees, the total wage fund throughout the whole of national economy is increasing from 32,700,000,000 rubles in 1932 to 50,700,000,000 in 1937, *i.e.*, a 55 per cent increase.

The increase in the expenditures of the proletarian State for the purpose of improving the material and cultural conditions of the working class is also a major factor raising the standard of living of the workers and employees.

The main items of appropriation for the above purpose totalled 4,308,400,000 rubles for the non-agricultural workers by the end of the First Five-Year Plan period; in 1937 this sum will rise to 9,284,300,000 rubles—215.5 per cent of the appropriation for 1932.

Total expenditures of the proletarian State and the trade unions for cultural and social services to be rendered to workers (engaged in non-agricultural labour) appear from the following data:

Kinds of benefits	Appropriations for cultural and social services for non-agricultural workers (million rubles)		1937 in % of 1932
	1932	1937	
Social insurance benefits:			
a) Benefits for temporary incapacity (inclusive of supplementary benefits)	553.3	666.4	120.4
b) Pensions	323.7	620.7	191.8
c) Miscellaneous social insurance benefits	33.1	55.1	166.5
Total for pensions and social insurance benefits	910.1	1,342.2	147.5
Trade union benefits	26 0	55.2	212.3
Scholarships	508.2	1,651.8	325.0
Education and cultural services	1,770 3	3,528.9	199.3
Public health (including prophylaxis)	1,033.0	2,586.2	250.4
Fund for the improvement of workers' living conditions	60.8	120.0	197.4
Total	4,308.4	9,284.3	215.5

Of the total sum appropriated as above indicated and received by the workers over and above their individual wages, the major portion (3,528,900,000 rubles) is being expended for education and cultural services by State organs as well as the trade unions.

The Second Five-Year Plan period is witnessing considerable increases in the sums to be expended by the trade unions for cultural purposes, primarily for the extensive development of clubs —centres of cultural rest for the workers. A number of cities and workers' settlements already have clubs which in point of equipment, capacity and artistic standard of performance are on a par with good theatres.

Great sums are planned to be expended by the trade unions for workers' rest, physical culture, etc. Special rest homes accommodating workers on their rest days, local excursions, workers' tourism, Parks of Culture and Rest, etc., are undergoing extensive development during the Second Five-Year Plan period.

One of the most important factors increasing the well-being of the proletariat during the Second Five-Year Plan period is the marked expansion of social insurance.

In 1937 the social insurance budget will comprise 6,750,000,000 rubles as against 4,400,000,000 rubles in 1932—a 53.4 per cent increase. This figure surpasses the aggregate State budgets of a number of big and small capitalistic countries. (Thus, Rumania's State budget was 400,000,000 rubles in 1929, Italy's was 2,030,000,000 rubles, Latvia's—70,000,000 rubles, Poland's—665,000,000 rubles, etc.)

The reorganization of the social insurance system which has been carried out on the principle of classification by branch of production, taken in conjunction with the active participation on a mass scale of insured workers, brings the insurance system into closer proximity with the masses, ensures that it will be strictly differentiated according to the production role played by the individual branches of labour (giving preference to leading professions, to the heavier and harmful kinds of work).

Expenditures by the social insurance system for various social and prophylactic purposes (rest homes, sanatoriums, crèches, feeding of school children, vocational rehabilitation and placement of invalids, etc.) are exhibiting particularly great increases.

The funds assigned in the social insurance budget for medical aid, prophylaxis, tourism, physical culture, dietetic feeding, child welfare service, the placement of invalids and workers housing construction are likewise scheduled to undergo a sharp relative increase during the Second Five-Year Plan period. In 1932 these

expenditures constituted 1,985,000,000 rubles, or 45.1 per cent of the total social insurance budget, while in 1937 they will constitute 4,204,000,000 rubles, or 62.3 per cent.

Epidemic diseases, a heritage of capitalist society, are being combated with greatly increasing vigour. As a result of all these measures, morbidity among workers is declining considerably; epidemics, occupational poisoning and accidents in the leading industries are in the main being eliminated with the result that the health and physical development of the working masses are improving rapidly.

In 1937, 2,072,000,000 rubles, or 30.7 per cent of the total social insurance budget, will be expended for medical aid to insured persons and their families. Appropriations for this purpose will be 2.5 times as great as in 1932.

There is to be a very considerable increase in appropriations for services for workers' children (maintenance of existing and construction of new crèches, kindergartens, milk stations, children's orphan homes, feeding of school children, etc.). While in 1932 expenditures for these purposes totalled 140,900,000 rubles, they will rise in 1937 to 713,000,000 rubles, a 5-fold increase, and will constitute 10.6 per cent of the total insurance budget in 1937. The extensive nature of the measures taken to provide services for workers may also be gauged by the fact that in 1937 all children of female workers employed in the leading branches of industry will be provided with crèche accommodations. Appropriations for crèches are increasing by 437 per cent, for milk stations—354 per cent, for kindergartens—250 per cent, etc. Appropriations for disease prevention are likewise increasing rapidly—from 229,700,000 rubles in 1932 to 549,000,000 rubles in 1937—an almost 2.5-fold increase.

State expenditures for the health protection of the toilers show particularly great growth. The total sum to be expended for medical and sanitary services is rising from 2,106,000,000 rubles in 1932 to 5,620,000,000 rubles in 1937. The expenditures for services to be rendered to the leading groups of workers and for such departments of the sanitary and prophylactic service as sanitary stations at enterprises (the number of which is increasing almost 1.5-fold), urban crèches (accommodations in which are increasing 2.6-fold), seasonal crèches (accommodations in which are increasing 2.3-fold), health resorts (the capacity of which is increasing

almost 1.8-fold), children's and adolescents' health protection institutions, etc., are all to grow at exceptionally rapid rates.

Capital investments by social insurance bodies for the construction of new sanatoriums, rest homes and other prophylactic institutions in which the most modern equipment is to be installed will total 108,000,000 rubles in 1937. The aggregate number of beds in sanatoriums and health resorts is rising to 110,200 (166.0 per cent of the number of beds available in 1932), while 2,034,000 persons will be accommodated in rest homes, or 122.5 per cent more than in 1932.

The bringing of prophylactic aid closer to production, the construction of local sanatoriums and health resorts in the vicinity of industrial districts and the proper organization of sanatorial institutions must be given special attention.

The number of toilers receiving treatment at health resorts is increasing from 736,000 in 1932 to 1,356,000 in 1937, a more than 1.8-fold increase.

Social insurance expenditures are also to rise considerably in the field of providing new kinds and forms of workers' rest (tourism, Parks of Culture and Rest, youth colonies, family rest homes, etc.).

There is to be a 6.5-fold increase in social insurance appropriations for physical culture.

Expenditures for extra-school services provided for workers' children, a new category of social service, will exhibit a 40-fold increase by the end of the Second Five-Year Plan period in comparison with 1932.

The plan for the Second Five-Year period likewise contemplates a further considerable increase in the benefits to be paid to secure better care of new-born infants, better infant feeding, etc. While in 1932 expenditures for these purposes totalled 85,000,000 rubles, in 1937 they are to increase to 213,600,000 rubles—a 2.5-fold increase.

Invalids of labour and the families of deceased workers and employees are to be provided for on a considerably broader scale. Social security of this character will involve an expenditure of 973,000,000 rubles in 1937 as against 483,000,000 rubles in 1932—a 2-fold increase. During the years of the Second Five-Year Plan period the social insurance bodies must introduce increases and differentiation in the pensions granted and must extend the

scope of the measures taken to place, train and retrain invalids.

As a result of the sharp decline in morbidity, the increasing well-being of the proletariat and the improvement in working and living conditions, the number of days paid for by the social insurance agencies as lost on account of temporary disability is receding sharply.

The insurance funds released on account of this reduction of temporary disability are being utilized for the further improvement of the social service extended to the proletariat.

Particular attention must be paid to giving priority service of higher quality to the leading branches of industry and transportation, to strenuous and harmful occupations, to shock brigade workers and workers of long standing in production, without failing at the same time to improve the service of the day-to-day needs of each individual worker which is to be directly commensurate with his merits as a producer.

No less important is the growth of the social security of the toilers under the Second Five-Year Plan. State budgetary expenditures for social security are multiplying almost 2-fold. There is to be a considerable increase in the amounts to be paid as pensions by the social security bodies, primarily to such members of families of persons called for service in the Red Army or Navy as may be unable to work. The special institutions for crippled children and chronic psychopathic patients—a new form of social service—are being extended on a very considerable scale. The Plan calls for the building of a number of workshops for vocational training in technical vocational schools and middle technical schools which are to prepare invalids to become trained specialists.

In the Second Five-Year Plan period there is to be a considerable increase in the mutual insurance activities of the handicraft and invalids' co-operative organizations.

The collective farmers' mutual aid societies which were organized at the end of the First Five-Year Plan period are playing an important part during the second quinquennial period in giving security to members of the collective farm population unable to work.

V

Public health, workers' rest and physical culture are to be greatly developed under the Second Five-Year Plan.

Capital investments in health protection, workers' rest and

physical culture (exclusive of funds appropriated for these purposes by industry, the People's Commissariat of Transportation and other economic People's Commissariats) total 2,875,000,000 rubles. This sum also does not include the cost of construction of institutions training medical cadres and establishments attached to hospitals. Besides, according to the budgets of the economic bodies, it is planned to invest 623,000,000 rubles in construction for public health purposes. If this sum is added, the capital to be invested in health protection will total 3,498,000,000 rubles as against 730,-000,000 rubles during the First Five-Year Plan period. The total expenditure for public health and physical culture (inclusive of operating costs) during the Second Five-Year Plan period is equal to 19,630,000,000 rubles as against 5,376,000,000 rubles during the First Five-Year Plan period.

The elimination in the main of epidemics in the Soviet Union and the reduction in general sickness on the basis of a general rise in the material, cultural and social standards of the toilers, of a qualitative and quantitative improvement of the medical system and the technical reconstruction of medical and sanitary institutions, must constitute the principle objectives to be gained by the public health service under the Second Five-Year Plan. At the same time the public health agencies must actively exert their influence through health stations at the various enterprises in favour of the hygienic rationalization of technological processes of production and must fight for a sharp reduction of the number of accidents in all branches of industry.

The sum of 423,000,000 rubles is being invested during the Second Five-Year Plan period in new hospital construction which will increase the number of hospital beds available in cities (exclusive of beds for special purposes, such as for tubercular, psychiatric and health resort patients) from 5.38 beds per thousand of the population in 1932 to 7.0 beds in 1937. In the most important industrial centres the number of beds available per thousand of the population is rising even in excess of these figures.

The health resort and sanitarium service is increasing at health resorts of all-Union as well as of local importance. Special attention must be paid to introducing sanatorial methods at health resorts and to assigning patients more carefully to the proper resort.

It is contemplated to increase the total number of beds at health resorts from 66,400 in 1932 to 110,200 in 1937. The total capital

to be invested in health resort construction during the Second Five-Year Plan period amounts to 275,000,000 rubles.

There is to be an increase in the number of health stations from 6,500 in 1932 to 9,700 in 1937. In big establishments it is planned to organize separate health stations in the biggest departments.

The sum of 80,000,000 rubles is to be invested for out-patient treatment in cities. Instead of the 8.45 out-patient visits per urban inhabitant in 1932, 12.0 such calls will be made in 1937.

Crèche construction is being extensively developed during the Second Five-Year Plan period as a means of further reducing mortality among children and of raising the labour productivity of female workers. One hundred million rubles exclusive of investments made by economic bodies have been appropriated under branch plans for the construction of crèches in cities during the Second Five-Year Plan period.

Children's feeding stations representing an investment of 11,000,000 rubles are to be built in the big industrial centres. The network of houses for the care of mother and child in the leading groups of industry is to be vastly expanded. In these houses female workers can secure competent obstetrical aid and can rest before and after childbirth.

Great development is contemplated for the construction of health protection institutions for children and adolescent workers, for which purpose 26,000,000 rubles have been assigned. In addition to this, close attention must be paid to the requirements of children in the construction of general hospitals and sanatoriums (children's hospital beds, sanatoriums for lung and bone tuberculosis, children's prophylactic dispensaries, etc.).

The medical service of the rural population is likewise undergoing extensive development during the Second Five-Year Plan period. The development of a network of medical institutions must take the course of establishing a large medical and sanatorial centre in the main locality of each district. This centre is to include a hospital with a polyclinic and child welfare institutions. Medical stations whose personnel is to have medium medical training and institutions of the type of dispensaries which are to render first aid and emergency medical service are to serve as branches of these centres throughout the district.

Of particularly great importance is the provision made to improve the main classes of hospital service for State farms, machine

and tractor stations and collective farms; primarily beds for infectious, maternity and surgical cases.

Capital investments for new hospital construction in rural districts during the Second Five-Year Plan period total 220,000,000 rubles. In absolute figures the aggregate number of beds is growing to a total of 105,000. There is also a simultaneous proportionate increase in the number of hospital beds per thousand of the population, rising from 1.23 in 1932 to 1.9 in 1937.

The rapid increase in the number of hospitals and sanatoriums in the national republics and regions is finally overcoming their backward state in the development of medical aid. This is particularly important for the eradication of a number of infectious and social diseases inherited from the colonial regime under tsarism.

The qualitative improvement in the curative and prophylactic aid extended during the Second Five-Year Plan period makes it necessary to reinforce the material and technical base of the public health service. It is therefore planned to invest 275,000,000 rubles in equipment for the new institutions to be built; 315,000,000 rubles have been assigned for general overhauling and the technical reconstruction incident thereto.

During the Second Five-Year Plan period the sanitary service is inaugurating the use of aeroplanes in which 20,000,000 rubles are being invested.

Extensive construction and development of first aid stations has been planned for the large cities.

During the Second Five-Year Plan period the rational organization of workers' rest on a mass scale acquires great importance. The proper organization of rest during and after work is becoming a powerful factor in favour of increasing labour productivity. Parks of Culture and Rest, local excursions and rest homes for rest days are to spread far and wide. The physical culture movement and tourism are planned to make great progress. The total amount to be invested in workers' rest and tourism has been set at 337,000,000 rubles. The Plan specifies an increase in the number of persons accommodated at rest homes from 914,000 in 1932 to 2,034,000 in 1937. These figures do not include persons in rest homes under the control of individual trade union organizations. The number of workers sent to rest homes is increasing in 1937 to 75 per 1000 insured as against 40.3 in 1932.

Great importance in the raising of the scientific level of medical service and in its technical re-equipment attaches to the All-Union Institute of Experimental Medicine in Moscow, founded in pursuance of a resolution of the Council of People's Commissars of the U.S.S.R. The sum of about 100,000,000 rubles has been assigned for the construction of this institute.

For the purposes of reinforcing and developing scientific research work and of establishing a base for the training of cadres of physicians specializing in epidemiology, it has been planned to build an All-Union Institute of Infectious Diseases in Moscow.

It is a further task of the Second Five-Year Plan to eradicate ignorance of general sanitary principles and to achieve extensive progress in the field of inculcating hygienic methods upon the toiling masses, inasmuch as this is a vital part of the cultural revolution. The network of Houses of Hygiene which serve as bases for the training of mass cadres and for the inculcation of modern hygienic habits upon the broad masses of the toilers is to be considerably extended.

Already the First Five-Year Plan period was distinguished for its great achievements in the field of improving sanitary conditions by introducing technical measures of work which led to a considerable reduction in the number of cases of general sickness and of occupational diseases of the workers and to a decided drop in the number of industrial accidents.

Under the Second Five-Year Plan still greater progress is to be recorded in this field, as a result of which morbidity is to decline to one-third and industrial accidents and occupational poisonings in all branches of national economy are to be sharply reduced.

The reconstruction of national economy during the Second Five-Year Plan period contemplates the creation of the healthiest and safest working conditions in the new establishments under construction as well as in the reconstructed establishments.

All measures for the sanitation of working conditions must be closely co-ordinated in their execution with the measures for the organization and rationalization of labour. The Second Five-Year Plan period must fully ensure the production, in the requisite quantities, of special safety appliances and of production equipment rendering working conditions safer, easier and healthier, as for instance explosion-proof electric supplies, safety explosive cartridges, hydrox, Brosius mud guns, ventilation equipment, electric

filters, rational lighting supplies, safety goggles, respirators, etc.

It is planned during the course of the Second Five-Year Plan period considerably to improve and rationalize the supply of work clothing to workers and to initiate the use of special kinds of work clothing designed by scientific institutions to meet the specific working conditions of particular enterprises or trades.

Special attention must be paid under the Second Five-Year Plan to the installation at the various enterprises of the necessary sanitary and hygienic conveniences (tub baths, shower baths, cloak-rooms, rest-rooms, lunch and dining rooms, etc.).

The extensive planting of trees, laying out of lawns, etc., on factory grounds and sometimes on the grounds of factory departments as provided for by the Plan, and the building of properly equipped gymnasiums, playgrounds, etc., are important items in preserving the health of the workers and creating additional incentives for raising the productivity of labour.

VI

The task of improving the material welfare of the toilers during the Second Five-Year Plan period necessitates the rapid development of the reconstruction of cities and municipal services.

The total capital to be invested in housing construction has been set at 13,400,000,000 rubles, inclusive of 12,502,000,000 rubles for urban housing, and dwelling construction reserved for the workers of particular factories, as against 4,040,000,000 rubles actually expended during the First Five-Year Plan period. Over and above the capital investments referred to, 185,000,000 rubles have been designed for hotel construction.

The new housing construction ensures an increase in the housing space made available during the Second Five-Year Plan period of 61,400,000 sq. metres, which is equivalent to about a third of the Soviet Union's housing space and will make it possible to increase the average per capita standard of space by 14.8 per cent, allowing for increase in the population. A total of 3,770,000 sq. metres of street floor space in the newly-erected dwelling houses is being reserved for trading and other non-resident premises.

The housing construction plan has taken into account the need for the energetic development of cities and of municipal services in the national republics. Thus, the capital investment in housing construction in the Central Asian republics which constituted

2.5 per cent of the total in 1932 is rising to 5.3 per cent in 1937.

It is contemplated to invest particularly large sums in the big industrial centres. In Moscow 4,500,000 sq. metres of housing space are to be built under the Second Five-Year Plan. In Leningrad—2,700,000 sq. metres; in Kharkov—1,150,000 sq. metres; in Sverdlovsk—1,200,000 sq. metres, etc. In quite a number of cities the housing space newly constructed during the Second Five-Year Plan period is doubling the existing space, thus offering the toilers considerably improved dwelling accommodations.

There is to be a considerable increase in housing construction in the new industrial districts. Capital investments for this purpose in the districts of the second coal and iron base (Urals, Kazakstan, Bashkiria) total 2,361,000,000 rubles, or 30 per cent of total investments in the Russian Socialist Federative Soviet Republic. This ensures 13,000,000 sq. metres of new housing space and a 33 per cent increase in the total available housing space.

According to the Plan the coal industry is to receive 5,400,000 sq. metres of new housing space during the Second Five-Year Plan period, for which purpose 1,015,700,000 rubles are scheduled to be expended.

The sum of 1,740,000,000 rubles has been allocated for housing construction reserved for the iron and steel and non-ferrous metals industries. In the machinery industry it is planned to invest 1,420,000,000 rubles which provides for 7,600,000 sq. metres of new housing space.

During the Second Five-Year Plan period the shift to housing construction on a mass scale based on maximum utilization of local materials and the adoption of standardization of certain parts of buildings and structural shapes must be accelerated. Particular attention must be paid to the introduction in housing construction of new central heating systems which do not require equipment of which there is a shortage, to the adoption of the most hygienic structures facilitating the extermination of vermin, to the wide use of fireproof structures, and finally, to the provision of interiors of buildings with special conveniences and household appliances of the latest design.

The principal line followed in the construction of dwelling houses during the Second Five-Year Plan is the use of brick and stone. The proportion of structures of these materials is to increase by 60 per cent.

However, standard assembled wooden buildings of considerably improved type and quality are also being erected.

Working class family apartments provided with all conveniences and at the same time offering the occupants the common use of such facilities as crèches, child-welfare institutions, dining rooms, laundries and premises dedicated to cultural and social purposes must become the basic type of new housing construction. Special attention must be given to the most economic disposition of the interior space of houses as well as to the architectural style of the exterior. The architectural designing of buildings and other elements which can contribute to artistic effect (the planting of greenery, etc., painting, etc.,) must be made prominent features in the construction of individual houses, of dwelling house blocks and entire city districts.

The Second Five-Year Plan contains special appropriations for housing construction in rural settlements, primarily on big State farms and in machine and tractor stations. Altogether 910,000,000 rubles of State funds are scheduled to be invested for these purposes which are to constitute the main base for the creation of a new type of housing construction (family apartments with truck garden patches) in socialist agriculture.

The total sum to be invested in municipal construction during the Second Five-Year Plan period has been set at 7,145,000,000 rubles as against 1,850,000,000 rubles under the First Five-Year Plan, *i.e.*, a 3.8-fold increase. Of this sum, 6,195,000,000 rubles have been allocated to municipal construction in cities, to be carried out by the respective Soviet Executive Committees and City Soviets. The balance is to be used for construction by industrial and other establishments which are being built in newly settled districts as well as by establishments in industrial districts in which municipal improvement projects are being carried out on factory premises themselves.

Inclusive of investments in municipal power stations, auxiliary enterprises of municipal trusts for the production of building materials and equipment, and the cultural and social institutions of municipal establishments, capital investments in municipal services of cities are to total 6,900,000,000 rubles.

The investments are being allocated as follows:

a) Sanitation (water supply, sewerage and street cleaning)—30.5 per cent; b) transportation—21.0 per cent; c) power systems

—11.2 per cent; d) sanitary and hygienic measures (public baths, laundries)—7.1 per cent; e) miscellaneous municipal service enterprises (road building, fire department, tree planting, hydrotechnical operations, etc.)—30.2 per cent.

The principal task in the field of water supply consists in reconstructing the existing water pipe lines in a number of big cities, increasing the number of urban inhabitants served, laying additional pipes and improving the quality of drinking water to safeguard the population against infection from this source.

Of the new major water mains to be laid, the Kharkov (Donetz) and the new Baku water-pipe systems are provided for in first order. In addition it is contemplated to start laying the Ladoga pipe-line in Leningrad. The total capital to be invested in the construction of water pipe-lines has been set at 906,600,000 rubles as against 289,000,000 rubles during the First Five-Year Plan period, *i.e.*, a more than 3-fold increase. Seventy-four cities are being added to the number of those equipped with water-works (the total increasing from 366 at the end of the First Five-Year Plan period to 440 at the end of the second period). This makes it possible to supply running water to all cities in the U.S.S.R. having a population of over 10-15,000.

As a result of these measures the aggregate population of cities supplied with water-works is increasing from 26,000,000 in 1932 to 37,500,000 in 1937, while the total water supplied is increasing from 63 litres to 95 a day per person.

During the Second Five-Year Plan period it is contemplated to invest 650,000,000 rubles in the laying of sewers, in comparison with 148,000,000 rubles under the First Five-Year Plan (an increase to 439 per cent of the latter figure). This is called for by the need to eliminate the disparity between the water supply and sewage systems, and the requirements of improved sanitation in the cities.

The scheduled volume of capital investments makes it possible for all cities with a population of over 50,000 to have sewage systems.

The sum of 181,200,000 rubles is to be expended on city cleaning as against 38,000,000 rubles under the First Five-Year Plan. The problems of garbage incineration or of the treatment of garbage by biological agents are being solved, taking into account the special conditions obtaining in the various districts. In cities using

the carting system instead of sewerage it is contemplated to improve and increase the number of sanitary conveyances, to shift to the use of motorized vehicles and to replace dumps by sewage farms.

The capital to be invested in the construction of public baths, swimming pools, special shower baths, etc., has been fixed at 260,000,000 rubles for the Second Five-Year Plan period as against 102,000,000 rubles during the first period. At the same time the capacity of the public baths is to increase 3-fold.

By the end of the Second Five-Year Plan period 13 per cent of the city population will have centralized laundry service in comparison with 1.6 per cent at the end of the first quinquennial period.

The sum of 753,200,000 rubles has been allocated to capital investments in street car and trolley bus line construction as against 322,000,000 rubles during the First Five-Year Plan period which will make it possible for all the principal centres to reconstruct their street car systems, particularly to replace narrow-gauge tracks by broad-gauge tracks, to build street car lines in 20 cities that had none before and to inaugurate trolley bus service in 5-6 cities of the Soviet Union. As a result of the capital investments specified, the total length of street car lines in single track equivalent will be 5,000 km. as against 2,870 km. during the First Five-Year Plan period, while the number of cars is increasing to 15,000 as against the former 8,000 which will make possible the transportation of 8,000,000,000 passengers a year.

It is proposed to have bus service in 200 cities during the Second Five-Year Plan period as against 117 cities during the first period while the number of busses is to increase from 1,400 to 7,200. Capital investments for this purpose have been set at 146,000,000 rubles as compared with 49,100,000 rubles under the First Five-Year Plan. It is planned to increase the number of passengers carried to 1,500,000,000 a year as against 300,000,000 during the First Five-Year Plan period.

The number of taxis to be operated for private use is to increase considerably during the period of the Second Five-Year Plan so as to afford extensive taxi service. Taxi service is to be organized in 40 cities with a capital investment of 40,000,000 rubles and the addition of 7,000 new taxis, so that it will be possible to convey 70,000,000 persons a year by taxi.

In municipal transportation by automobile and water craft

190,900,000 rubles are to be invested as against 57,600,000 rubles under the First Five-Year Plan.

Street paving during the Second Five-Year Plan period is to absorb 830,000,000 rubles, which will bring about an increase of 55,000,000 sq. metres in paved area. Of the total sum to be invested, 300,000,000 rubles have been appropriated for improved paving which will result in an almost 3-fold increase in the area of the latter, raising it to 15,000,000 sq. metres.

Power economy—the construction of electric power stations, of central heat-and-power plants and of gas works and gas lines—constitutes one of the elements remoulding the lives and improving the material and social conditions of the working class. The total amount to be invested in this branch of Soviet economy during the Second Five-Year Plan period has been set at 633,000,000 rubles as compared with 204,300,000 rubles so invested under the First Five-Year Plan, an increase to 309.8 per cent of the latter figure. These investments are being distributed as follows: electric power station construction—470,000,000, gas works and gas pipe-lines—110,000,000 rubles and central heat-and-power plants—53,000,000 rubles.

The installed capacity of municipal power stations is increasing from 254,900 kw. at the beginning of the Five-Year Plan period to 600,000 kw. at the end of the period while the amount of energy produced is rising from 709,300,000 kwh. in 1932 to 1,600,000,000 kwh. in 1937.

The network of gas pipe-lines is growing from 620 km. at the end of the First Five-Year Plan period to 1,530 km. at the end of the Second Five-Year Plan period. The central heat-and-power network will expand to 300 km. by the end of the second quinquennial period.

The Plan has set aside 124,000,000 rubles to be invested in the planting of greenery in the cities during the Second Five-Year period which will make it possible to increase the area in cities covered by trees, lawns, etc., to 35,000 ha.

The Second Five-Year Plan period is witnessing the construction of the Moscow subway, the first underground railroad in the U.S.S.R., for the construction of which 1,200,000,000 rubles are being assigned during this period.

The total length of subway tunnels to be opened for operation is 36 km., of which: Myasnitskaya-Frunze section—12.4 km;

Arbat-Rogozhskaya Gate section—8.7 km. and the Taganka-Tverskaya section—13.7 km., with an additional 1.2 km. for sidings.

The extent of the building operations involved in the construction of the subway is characterized by the following principal data: the amount of earth to be removed during the Second Five-Year Plan period totals more than 6,000,000 cu. metres, while more than 2,500,000 cu. metres of concrete are to be poured.

The main items of work expressed in terms of money exceed 800,000,000 rubles. Terminals, depots, workshops and rolling stock consume more than 150,000,000 rubles. Construction machinery and implements, living quarters and auxiliary structures require the investment of about 250,000,000 rubles.

It is planned to carry about 700,000,000 passengers by subway in 1937.

VII

The planned further increase in the material security and further rise in the cultural level of the toilers find very striking expression in the tremendous growth of the population. The Second Five-Year Plan period is a quinquennium of further reduction in mortality and a rise in the birth rate, as a result of which the population is increasing from 165,700,000 as of January 1, 1933, to 180,700,000 as of January 1, 1938, *i.e.*, an increase of 15,000,000 (9.1 per cent) with an average annual increase of 17.3 per thousand.

Due to further industrialization the urban population is increasing at a particularly rapid rate.

The 6,400,000 increase in urban population during the Second Five-Year Plan period (a growth of 16.1 per cent as against 6.8 per cent in the rural districts) is to be attributed to the natural increase of the population and to migration from the countryside.

The villages are supplying the cities with about a third altogether of the additional cadres required for work in the various branches of national economy, and of those engaged in studying. The migration of the rural population to the cities is regulated, on the one hand, by drawing collective and individual farmers in an organized manner into the ranks of the industrial, construction and transport workers; on the other hand, by enrolling a portion of the rural youth in urban educational institutions.

The influx of rural inhabitants into the cities is accompanied by a reverse process—the outflow of urban inhabitants to the coun-

tryside. The further growth and consolidation of socialist agriculture during the Second Five-Year Plan period and the completion in the main of its mechanization require a great increase in cadres of skilled workers as well as of engineers, agronomists, physicians, educators, etc., which the city must supply.

The proletarian cities are transferring to the countryside about 1,000,000 trained persons taken from the graduates of factory vocational schools, colleges, middle technical schools and other educational institutions.

As a result of both of these processes—the drawing of rural inhabitants into the cities and the reverse flow of trained workers to the countryside—the urban population is gaining 4,000,000 persons at the expense of the rural districts.

It must also be taken into account that the growth of large-scale, socialist agriculture—the development and consolidation of the State farms and machine and tractor stations—are attended by changes in the very type of the rural settlements. The increasing technical equipment for agricultural production, the transformation of agricultural labour into a variety of industrial labour, the development of establishments for the processing of agricultural products and the expansion of the network of cultural and social institutions (schools, hospitals), make the rural settlements more akin in type to urban settlements.

Such urban-type settlements are to comprise a population of approximately 3,000,000 by the end of the Second Five-Year Plan period.

If this process, too, is taken into consideration, the urban population is to comprise 49,100,000 persons by the end of the Second Five-Year Plan period, *i.e.*, 23.7 per cent in excess of the figure for 1932, as a result of which the urban population will constitute 27.2 per cent of the total population at the end of 1937, as against 24.0 per cent at the end of 1932.

The Second Five-Year Plan period is a quinquennium of the further radical improvement in the material welfare of the toilers of town and country. The realization of the measures outlined "establishes such working and living conditions for the working class as make it possible for us to raise a new generation of hale and hearty workers capable of elevating to the requisite level the might of the Land of Soviets." (Stalin.)

COST AND QUALITY OF PRODUCTION

I

THE task of mastering the new material and technical base of national economy lends cardinal importance to the provisions of the Plan concerning the qualitative indices during the second quinquennial period. The Plan for this period takes as its point of departure a considerable increase in labour productivity and a decrease in the cost of production based on the completion of technical reconstruction in national economy and the mastery of the new technique.

The improvement in qualitative indices projected in the Second Five-Year Plan ensures the opening up of supplementary sources of accumulation in heavy industry and considerably raises the profitableness of light industry, of the food industry and of the railway transportation system. The planned extent of reduction in the cost of production and expense of distribution makes possible a 35 per cent decrease in retail prices. The total saving to be effected in 1937 by reducing production costs in the principal branches of national economy below the level of 1932 has been set at 34,500,000,000 rubles.

The share of the individual branches of national economy in the reduction of production costs and their contribution to the planned saving appear from the data in table on p. 464.

For the whole five-year period the saving to be effected by reducing costs of production and expenses of circulation in national economy represents a total of about 70,000,000,000 rubles. Every per cent by which expenses are being reduced in national economy during the last year of the Second Five-Year Plan period below the level of 1932 is equal to the enormous sum of over 1,100,000,000 rubles.

In the main the planned reduction in the cost of production is based on: a) rapid rates of increase of labour productivity, b) improved utilization of material resources and c) sharp reduction in unproductive overhead expenses. The realization of each of these decisive conditions for the reduction of production costs is assured by the completion of technical reconstruction in

Branches of national economy	Saving to be effected, in million rubles	Percentual reduction in expenses for 1937 in comparison with 1932	Saving of individual branches of national economy in % of total saving due to lowered production costs
All industry	13.003 6	26.0	37.8
Construction (proper)	8.729 0	40.0	25.3
Handicraft co-operative organizations (all)	1.943.7	19.0	5.6
Transportation (all modes except horse-drawn)	7.465 8	40.0	21.7
Trade (state and co-operative)	1.665 6	26 0	4 8
P. C. of State Farms	1.650 9	63.3	4.8
Total	34,458.6 [1]	30.0	100.0

[1] This total contains some elements of duplication in the motor haulage done by industry, State farms and trading enterprises themselves. However, there is no inflation of the total inasmuch as a number of branches of national economy (municipal services, horse-drawn transportation, etc.) are not included.

national economy, the establishment of socialist labour discipline, the increased skill of the workers, the considerably greater proportion of engineers and technicians in industry, the considerably improved management of production, the greater emphasis on cost accounting and the most stringent economy in the use of existing resources.

In determining the amount of labour and material to be expended on reproduction in each branch of national economy, the Plan proceeds from the point of view that it is necessary to improve the quality of output in industry and agriculture and to improve the service received by the consumer in the transportation and trading systems.

Thus the saving to national economy achieved as a result of improved qualitative indices under the Second Five-Year Plan will appreciably exceed the saving gained by the planned reduction in production costs inasmuch as the output will be of higher quality.

II

In industry (People's Commissariats of Heavy Industry, of Light Industry, of Timber and of Supply, and the Produce Procurement Committee of the Council of People's Commissars), the Second Five-Year Plan provides for a 26 per cent reduction in the cost of production in 1937 as compared with 1932.

The saving to be effected in 1937 by reducing production costs in commodity production below 1932 costs has been fixed at over 13,000,000,000 rubles for the whole of industry, which ensures a considerable increase in its profits. If the annual changes in the production costs are taken into consideration, production costs in commodity production for all the five years are to be 14.7 per cent below those of 1932 which will yield a saving of about 26,500,000,000 rubles for the entire Five-Year Plan period.

In the individual People's Commissariats, production costs are to be reduced to the following extent:

People's Commissariats	Reduction in production costs in 1937 in % of 1932	Accumulated % of decrease for the five years	Average annual rate of decrease
P C. of Heavy Industry	32.5	19.8	7.3
P. C. of Timber	19.5	8.7	4.4
P. C. of Light Industry	16.0	7.8	3.5
P. C. of Supply	25.0	13.5	5.5
Produce Procurement Committee of the Council of People's Commissars . . .	15.0	9.2	3.2

Note: The accumulated percentage of decrease in the cost of production for the five years denotes the reduction in commodity production expenditures for the entire Five-Year Plan period, as compared with expenditures for the same output in terms of fixed 1932 production costs.

The average annual decrease in the commercial cost of production [1] for all industry during the Second Five-Year Plan period has been set at 5.7 per cent (in heavy industry—at 7.3 per cent) while there is to be a further increase in the number of workers and a tremendous improvement in their welfare.

The annual changes in the decreases of production costs in industry as given for the Second Five-Year Plan period are based on higher rates of decrease for the last years of the Second Five-Year Plan period. Thus while production costs were decreasing 1.5 per cent in industry as a whole in 1933, they are to be reduced 8.5 per cent in 1937, while in heavy industry the corresponding figures are 4.5 and 9.2 per cent. The highest average annual reduction in the cost of production in previous years (from 1927 to 1932)

[1] The task assigned takes in the complete commercial cost of production: factory or mill cost of production plus non-factory expense items (exclusive of tax).

was 5.5-6.5 per cent. However, while each per cent of decrease in the cost of production for all industry in the above-mentioned years (within the comparable scope of commodity production) meant a saving of 130,000,000 to 140,000,000 rubles, in 1937 each per cent will yield more than 450,000,000 rubles.

In the machinery and oil industries which had undergone thorough technical re-equipment even before the First Five-Year Plan period, production costs were systematically lowered during the progress of this period. The decrease in the cost of production during the last years of the First Five-Year Plan period in the field of machinery production was based mainly on mastering the manufacture of new items of production (automobiles, tractors, etc.).

The further big reduction of production costs in the machinery industry during the five years of the Second Five-Year Plan period, which exceeds the rates of decrease of almost all the preceding years, is based mainly on a great increase in the list of new manufactures which are being mastered.

If the 4.5 per cent reduction in production costs achieved in 1932 in the machinery industry was to be ascribed primarily to the automobile and tractor industries, the 14 per cent decrease secured in 1933 was already based on notable qualitative improvements in almost all branches of machinery production.

While during the First Five-Year Plan period only a few branches of industry were able to report a considerable decrease in production costs, during the second period all branches of national economy must effectuate considerable reductions in their cost of production. In the so-called highly labour-absorbing branches of industry the qualitative indices of which exhibited a lag during the first quinquennium the planned rate of decrease in production costs is not lower than the average rate set for industry as a whole.

The transfer of a number of industries from the classification of highly labour-absorbing to that of technically well-equipped industries finds direct expression not only in the level but also in the structure of their cost of production.

The increasing relative importance in production costs of material consumption, primarily depreciation and electric power which directly reflect the level of the technical equipment, accompanied by a certain recession in the percentage which expenditures

involving the consumption of labour power constitute, together with a sharp proportional reduction in unproductive expenses are a striking expression of the successful mastery of the new technique.

Before industry is placed the task during the Second Five-Year Plan period of mastering not only the new capacities but also the manufacture of new products of higher quality, the creation of new lines of manufacture, the output of new kinds of manufactured goods, the increase in the number of types of machines and machine-tools, the further introduction of new kinds of raw materials in a number of industries, etc. The development of new districts and the more effective utilization of the natural resources of the country are also paramount tasks. In order to fulfil its production program the oil industry must develop new oil strata and new oil fields in the East. The coal industry must raise the proportion of coal mined in the new (eastern) districts. The timber industry is confronted with the task of developing the extensive northern forests and of increasing the relative importance of timber operations in remote forests. In the fish industry deep-sea fishing is to occupy an important place.

All these tasks which are connected with the mastery and better utilization of the new material and technical base of industry during the Second Five-Year Plan period find their expression in the projected indices of growth of labour productivity and of reduction in production costs.

The highest tasks with regard to quality have been assigned to those branches of industry in which the indices of technical reconstruction and of the mastery of new lines of manufacture surpass the average rates for industry as a whole. Industries containing the greatest proportion of new large-scale establishments must attain especially high qualitative indices. To this category belong in the first place the machinery, the coal and the iron and steel industries. These most important branches of heavy industry account for 65 per cent of the total saving to be effected by heavy industry as a result of lowered production costs.

In the new types of production the decrease in the cost of production is also planned to exceed considerably the average reduction in production costs for industry as a whole. Thus in machinery manufacturing the average reduction in the cost of production is to be 40 per cent but in a number of recently mastered lines of

manufacture, a 50 to 60 per cent decrease has been specified. The most important kinds of newly evolved products in the non-ferrous metals industry are to have their cost of production diminished by 55-60 per cent. While the average rate of production-cost reduction for light industry has been fixed at 16 per cent, the planned decreases for the new branches of this industry are greater, as follows: in the manufacture of musical instruments—25.5 per cent, of scientific school supplies—35 per cent, of cottonine—36.6 per cent.

In a number of individual branches the assigned reduction in the cost of production is considerably in excess of the average rate, in consequence of the development of new districts. Thus, for instance, in the oil industry the new oil districts have been assigned the highest rate of production-cost reduction. The Eastern Oil Trust is to lower production costs by 47.0 per cent, the Turkmenian Oil Trust—by 76.5 per cent, the Georgian Oil Trust —by 44.5 per cent, etc. Great reductions in the cost of production have also been specified for the newly developed districts of a number of other branches of industry.

The rise in the productivity of labour is the decisive factor determining the fulfilment of the outlined plan of reduction of production costs.

Production costs as a whole are being lowered in industry by 26 per cent, of which the excess in the rate of increase of labour productivity over the rate of increase in the wage fund is to account for 11.3 per cent.

The relation between the rates of increase in labour productivity and those of wages are exemplified in the following table:

Branches of industry	1937 in % of 1932	
	Labour productivity	Wages
Coal	191.0[1]	129.5
Iron and steel	200.0	123.9
Machinery	185.0	115.7
Cotton goods	148.0	139.0
Leather and shoe	142.0	120.0
Food	160.0	122.0

[1] Increase in output expressed in physical quantities.

Parallel with this, the rate of growth of industrial output is considerably surpassing the rate of growth of the wage fund for employees, *i.e.*, during the Second Five-Year Plan period expenditures for employees' wages per ruble's worth of output are being considerably reduced. Simultaneously the entire wage fund of industry is to a certain extent undergoing a structural change. While during the last two years of the First Five-Year Plan period there was an increase in the proportion which employees' wages formed of the total wage fund, in the Second Five-Year Plan period, as a result of the struggle to deflate overstaffed offices, the proportion which employees' wages form of the total wage fund must be curtailed from 11.6 per cent to 7.8 per cent. Employees' wages per ruble of gross output in industry are decreasing from 3.0 kopeks to 1.4 kopeks, while the average wages in industry of engineers and technicians is increasing 20 per cent, and of employees in industry by 13.3 per cent in comparison with the level of 1932.

The rise in the level of labour's technical equipment necessitates an improvement in the qualitative composition of labour power and an enhancement of the role of technical direction. The proportion of skilled workers in industry is growing appreciably. If in the First Five-Year Plan period 11 per cent of the total number of workers newly added to industry were skilled workers who had been specially trained (in factory vocational schools), in the second quinquennial period more than half of all new workers drawn into industry belong to the category of skilled personnel who have received special training.

The vast increase in the mechanization of laborious processes conduces to a proportionate rise in the number of skilled workers, especially in the coal and the iron and steel industries. The increase in the proportion of engineers and technical personnel is accompanied by an increase in their skill.

In 1937 there will be 6.9 graduate engineers and technicians for every hundred workers employed in heavy industry, as against 3.9 engineers and technicians at the beginning of the Second Five-Year Plan period, *i.e.*, a 77 per cent gain, while in light industry the gain will be 76 per cent.

The 16.5 per cent reduction in expenditures for raw materials and auxiliary materials including fuel, per unit of output, as a result of retrenchment in the rate of consumption and in overhead expenses for raw materials and fuel, ensures an almost 9 per cent

reduction in the cost of production throughout the whole of industry, yielding a saving of almost 4,300,000,000 rubles. The reduction in the cost of production made possible by this factor is to be ascribed to the vast increase in new equipment, to better utilization of the old equipment, the vast growth of mechanization, etc.

The decrease in production costs planned for the Second Five-Year Plan period must proceed side by side with a decided improvement in quality. The latter is playing a very great role in national economy in conjunction with the lowering of the cost of production.

The improvement in the utilization of material consumption in the principal branches of national economy is alone contemplated to yield in 1937 a saving of 9,500,000,000 rubles in comparison with 1932, and of about 20,000,000,000 rubles for all the years of the Second Five-Year Plan period. A considerable proportion of this saving is to be secured by improving the quality of the means of production themselves. This sum, however, does not by far denote the entire saving to national economy. Thus, for instance, it suffices to point out that the decrease in the ash content and the moisture of coal not only reduces coal (coke) consumption per ton of pig iron and entails an improvement in the utilization of blast furnaces, but is an essential factor making for economies in the utilization of the rolling stock of the railroads.

The shift in a number of industries to local raw material and fuel is a very important factor determining better utilization of material resources. The proportion of long-haul fuel in power production is being decreased from 33.8 per cent to 21 per cent inclusive of a reduction in oil from 19.6 per cent to 4.1 per cent, while the proportion of hydro-electric power is rising from 7.3 per cent to 19.5 per cent. The cost of production of electric current is being reduced by approximately 10 per cent to be effected by increasing the proportion of hydro-electric power; at the same time the decrease in the consumption of long-haul fuel and the increase in the consumption of hydro-electric power give rise to a great improvement in the utilization of transportation facilities.

Hand in hand with the saving effected in fuel consumption at electric power stations amounting to 4,000,000 tons of conventional fuel in 1937, hydro-electric power generation will secure economies totaling 2,500,000 tons of conventional fuel. The production of centralized heat at central heat-and-power stations yields fuel economies totalling about 2,000,000 tons of conventional

fuel, and at the same time leads to a 3-4 per cent reduction in electricity production costs (out of a total reduction of 29 per cent). The vast growth of electrification is a factor making for a great saving of fuel in national economy. In addition the power consumed per unit of light of electric bulbs is to be lowered 10 per cent as a result of improved quality of bulbs.

The structural changes in fuel consumption by the various branches of national economy during the Second Five-Year Plan period are likewise of vital significance in the reduction of production costs. The utilization of gas implies a relative increase of from 2.9 per cent to 5.1 per cent in the fuel balance of industrial consumption; the proportion of peat is increasing from 4.0 per cent to 4.7 per cent, while the proportion of wood is decreasing from 13.3 per cent to 7.2 per cent.

During the Second Five-Year Plan period it is necessary to achieve not only a 17 per cent reduction in the rate of fuel consumption per unit of output, but also a marked structural change in the quality of fuel utilized. Great importance for the reduction of production costs in a number of industries attaches to the improvement in the quality of fuel. The more than 3.5-fold increase in the mechanized dressing of Donetz coal in 1937 when compared with 1932 ensures a decrease in the ash content of Donetz fuel from 11.31 per cent to 8.5 per cent, and of sulphur content—from 2.59 per cent to 1.6 per cent. This fact is to account for an 8.5 per cent reduction in the coke consumption rates per ton of pig iron out of a total reduction of almost 20 per cent projected for these rates.

The improvement in the quality of coal is to account for a saving of 1,200,000 tons of coke, while the total saving by way of reducing the consumption rate of coke in the iron and steel industry in 1937 has been set at 2,300,000 tons. The reduction in the fuel consumption rate in the iron and steel industry causes a more than 5 per cent decrease in production costs (out of a total drop amounting to 33 per cent). If the rate of consumption and the quality of coke were to be maintained at the level of 1932, two additional big coke combinations would have to be built in order to fulfil the program mapped out for the iron and steel industry. The reduction in the ash content of Karaganda coal from 17.4 per cent to 12.5 per cent decreases the transportation of useless freight by 150,000 tons, which eliminates 180,000,000 ton-km. of unnecessary freight traffic and effects a saving of more than 10,000 cars.

The increase in the proportion of conditioned refractory manufactures to 75 per cent in 1937 is a very important factor in the 35 per cent decrease of material consumption rates in the iron and steel industry and in the more than 2.5 per cent decrease of production costs on this account.

The change in the quality of output of the machinery industry and in the structure of the output manufactured is strictly dependent upon the quality of output of the metallurgical industries. The increase in the output of special rolled products from 12.9 per cent to 15.4 per cent; the rise in the proportion of electric steel from 1.7 per cent to 3.5 per cent; the vast expansion of the non-ferrous metals industry, etc., characterize to a considerable extent the qualitative changes in the structure of the output of the metal industries and constitute the principal material preconditions of qualitative improvement in the machinery industry.

During the Second Five-Year Plan period it is necessary in the machinery industry to reduce the rate of consumption of metal 20 per cent (by more extensively using electric welding, changing designs, projecting lighter models, etc.), while simultaneously increasing the efficiency of each unit manufactured.

Thus in the machine-tool industry the elimination of obsolete and low efficiency designs and the introduction in the factories of heavy grinding, gear cutting and vertical boring-and-turning machines, as well as of automatic and semi-automatic machinery jointly with improved designing, increased cutting speed, specialization of machine-tools, etc., must raise the productivity of machine-tools by the end of the Second Five-Year Plan Period at least 1.5-fold. The 40,000 machine-tools which it is planned to turn out in 1937 will be able to do the work of approximately 60,000 machine-tools of the efficiency standard prevailing at the end of the First Five-Year Plan period. The shift to new types of portable steam engines makes possible a substantial reduction in the metal consumed per horse power and at the same time lowers the fuel consumption per horse power.

The widening of the reach of the flax-pulling machines from 0.6 metres to 2.0 metres makes it possible sharply to increase the mechanization of flax pulling with a relatively smaller number of machines; the increase in the average load capacity of freight cars from 29.0 to 47.0 tons ensures considerably more efficient utilization of the rolling stock. The ratio of the load

capacity of 3,900 to 4,000 ton tankers to their respective weights is rising from 8.7 in 1932 to 9.3 in 1937, which is improving the conditions of exploitation and decreasing the metal consumption per unit of load capacity.

The reduction in the rate of metal consumption brings about a 12 to 13 per cent decrease in the cost of machinery production. At the same time the utilization of every ton of metal in the manufacture of machinery to secure more efficient output is playing a very important part in the reduction of production costs of other branches of national economy also.

The improvement in the qualitative indices of the building industry presupposes an increase in labour productivity, rationalization in designing, better utilization of building materials as well as a decided improvement in the quality of the latter. The Plan of the second five-year period contemplates an increase of from 13.3 per cent to 29 per cent in the proportion which the highest grade of cement ("000") forms of the total output of the cement industry. The improvement in the quality of cement means a saving of approximately 10,000,000 barrels.

Utilization of waste products or, to be more precise, their conversion into valuable products is a powerful factor in the reduction of production costs during the Second Five-Year Plan period along the line of material consumption. This refers in the first place to the new manufactures, the comparative high production costs of which during the period of the First Five-Year Plan was due to the poor utilization of by-products and in a number of cases to waste (gas, heat, etc.). The problem of completely mastering the production of synthetic rubber lies for instance in the direction of completely utilizing all so-called waste, but in reality highly valuable, products.

The rise in the proportion of output obtained from new or newly reconstructed establishments to 80 per cent of the total output during the Second Five-Year Plan period is the most important pre-condition of improvement in the utilization of material resources. The giant combinations (particularly meat-packing plants) already built and mastered which have replaced the scattered small establishments with their low level of technique suffice to illustrate the vast reserves of intra-factory accumulation. By utilizing the carcass to a greater extent the meat-packing plants ensure an additional 200,000,000 rubles' worth of meat industry products in 1937 and a 5 per cent decrease in the average

cost of production for all meat products (with the total decrease set at 24.5 per cent).

Light industry is to achieve a 16 per cent decrease in production costs and the food industry a 25 per cent decrease, while the quality of output is to improve greatly. The considerable improvement in the quality of cotton manufactures, the growing proportion of woollen goods, the increasing share of fine wool (in worsted fabrics—from 6.4 per cent to 33 per cent and in fine cloth—from 4 per cent to 8.5 per cent), the almost 4.5-fold rise in the output of pure wool fabrics, the increasing percentage of wool in the knit goods industry and the notable qualitative improvement in the assortment of all branches of the textile industry must be achieved in conjuction with a simultaneous more than 14 per cent reduction of production costs in this industry. The improvement in the quality of spinning and of the finished product ensures a 5 per cent saving in raw materials and a consequent reduction in production costs amounting to almost 3 per cent.

In the meat industry a 24.5 per cent decrease in production costs must be attained while the proportion of pork is to multiply more than 6 times, the assortment is to be greatly enlarged and the quality of every kind of product is to undergo decided improvement (an increase in the proportion of high-grade sausage from 20 per cent to 60 per cent, an almost 6-fold rise in the output of edible fats, etc.).

The better utilization in industry of agricultural raw materials planned for the second five-year period also depends on the improvement in the quality of agricultural products. The level of production costs of light industry and the food industry depend to a considerable extent on the quality of the agricultural raw material. In the conditions of socialist reconstruction in agriculture, a decided improvement in the quality of output constitutes a most important part of the production program of planned socialist agriculture. The more than 5-fold increase in the proportion which Egyptian cotton forms of the total cotton harvested, the rise in the average grade of long-fibre flax from 7.9 to 14, the proportionate increase of fine wool from 4.7 per cent to 17.5 per cent and of semi-coarse wool from 15.5 per cent to 28 per cent render possible a sharp qualitative improvement in the output of the textile industry and a diminution in the material consumed per unit of output.

The improved utilization of the material resources is a factor in the actual augmentation of production in national economy. Tentative calculations on the effectiveness with which material resources are being utilized in very important industries show the following: reducing the fuel consumption rates per kwh. of electric energy will result in the production of additional electric power totalling 5,000,000,000 kwh. in 1937 (out of 38,000,000,000 kwh.); the decrease in the rate of consumption of raw materials in the cement industry yields an increase of 3,000,000 barrels of cement (out of 48,400,000 barrels). The improvement in the quality of cement signifies a diminution in the demand for this item in the building industry amounting to almost 10,000,000 barrels; the decrease in the consumption of wood in the saw-mill industry ensures an output of an additional 2,000,000 cu. metres of saw logs. The better utilization of material resources in the paper industry is resulting in an additional paper output totalling approximately 50,000 tons. The increase in the durability of electric bulbs from 750 hours to 1,000 hours signifies a saving of 55-60,000,000 electric bulbs in 1937, etc.

In the branches of light industry the better utilization of raw materials ensures the following increases in output: 275,000,000 metres of fabrics in the cotton industry, 17,000,000 metres in the woollen industry, 5,800,000 pairs of shoes, 25,000 tons of twisted goods (out of a total increase of 98,000 tons), and 82,000,000 metres of linen fabrics (out of a total increase of 470,000,000 metres). In 1937 better utilization of material resources in the principal branches of national economy will be responsible for a saving in excess of 9,500,000,000 rubles and for a more than 10 per cent reduction in the cost of production out of a total reduction of 30 per cent.

Of the 13,000,000,000 rubles representing the total sum economized in industry, about 4,300,000,000 rubles are being derived from better utilization of raw materials and auxiliary materials including fuel. Of the 26 per cent total reduction in production costs in industry, almost 9 per cent are accounted for by economies in material consumption. The saving obtained from the improved utilization of material resources almost equals the saving effected by increased labour productivity.

The better utilization of material resources influences not only the rates of increase of output under the Second Five-Year Plan and the extent of the decrease in production costs, but also

the volume of capital investments, inasmuch as the production program mapped out for the Second Five-Year Plan period would require a much greater volume of capital investments if the utilization of material resources were to be maintained at the level of 1932 in both quality and structure.

The decrease in overhead expenses is an essential factor in the reduction of production costs. The more intensive utilization of the production capacities of enterprises establishes a more proper correlation between basic and auxiliary workers, between the number of workers and that of employees, and determines a sharp decrease in expenses for administration and overhead and to a certain extent also in transportation expenses. It is planned to lower these expenses by 46 per cent per unit of output in industry which will result in a more than 6.0 per cent decrease in industrial production costs, and a saving of more than 3,000,000,000 rubles in industry and of more than 6,500,000,000 rubles in the principal branches of national economy as a whole.

In a number of industries the rates of increase of fixed capital exceed the rates of increase of output (iron and steel, oil, electric power stations, coal, etc.) in consequence of which the depreciation per unit of output is increasing. If in 1932 depreciation amounted to 3.1 kopeks per ruble of gross output of industry (in fixed 1926-27 prices), in 1937 the depreciation will rise to almost 5 kopeks. Besides this rise in depreciation there is also an increase in the proportionate consumption of electric current during the Second Five-Year Plan period while the consumption of fuel is appreciably decreasing.

Structure of Cost of Production in Industry

Elements of Cost of Production	1932	1937
Total commercial cost of production	100.0	100.0
of which:		
Material consumption (raw materials and auxiliary materials including fuel, and electric power) .	50.7	56.1
Depreciation	3.6	4.8
Wages	33.6	30.6
Expenses for administration and management and miscellaneous unproductive expenses . .	12.1	8.5

The change in the structure of production costs during the Second Five-Year Plan period fully reflects the projected achievements in the mastery of the material and technical base. While the share of depreciation and material consumption in the cost of production is increasing, there is a decrease in the share con-

stituted by wages (particularly those of employees) and a sharp decline in the proportion of non-factory and miscellaneous unproductive overhead expenses (which recede from 12.1 per cent in 1932 to 8.5 per cent in 1937).

While overhead expenses constitute 12 per cent of industry's production costs, the reduction in these expenses will yield a saving of more than 23 per cent of the total reduction in production costs.

The decrease in the cost of production according to individual People's Commissariats and the proportion which they contribute to the total saving effected by reduced production costs are exhibited in the following table:

People's Commissariats	Percentual decrease in 1937 production costs below 1932 costs	Saving to be effected in 1937 by reduction of production costs in million rbs.	Saving effected by People's Commissariats, in % of total.
P. C. of Heavy Industry	32.5	6,667 0	51 3
P. C. of Timber	19 5	773 6	5 9
P C of Light Industry	16 0	2,204 4	17 0
P. C. of Supply	25.0	2,975.3	22.9
Produce Procurement Committee of the Council of People's Commissars	15.0	383 3	2.9
Total for industry	26.0	13,003.6	100.0

As appears from the data given in the table, about 50 per cent of the total saving secured from the reduction of production costs is to be achieved by the People's Commissariat of Heavy Industry. The significance of the individual factors in the reduction of the cost of production according to People's Commissariats is shown in the following table:

People's Commissariats	Total reduction in production costs	Of which: accounted for by			
		Material consumption[1]	Excess of increase in labour productivity over increase in wages	Overhead	Depreciation
P. C. of Heavy Industry	32.5	8.3	17.4	7.3	—0.5
P. C. of Timber . .	19.5	5.6	7.6	6.3	—
P. C. of Light Industry .	16.0	5.4	7.2	3.1	0.3
P. C. of Supply . . .	25 0	12.4	5.7	6.7	0.2

[1] Calculated in trust selling and procurement prices of 1932 for raw and auxiliary materials, including fuel and electric power.

In heavy industry, the branches which are of decisive importance for the fulfilment of the plan to reduce production costs during the second five-year period are machinery, metal and coal production which are to yield about 65 per cent of the total saving to be effected by production-cost reduction.

The cotton-goods, needle-trades, leather and shoe and the knit-goods branches of light industry account for almost 60 per cent of the total economy to be achieved by decreasing the cost of production in the enterprises under the People's Commissariat of Light Industry. In the food industry the meat, fish and sugar producing branches are to supply more than 52 per cent of the economies planned as a result of cost reduction under the People's Commissariat of Supply.

In the machinery industry a 40 per cent reduction in the cost of production has been projected in comparison with 1932, while in a number of branches of this industry (automobile and tractor manufacturing and other new branches of machinery production), the reduction is to be more than 50 per cent.

Such a considerable reduction of production costs in the machinery industry is based on the growth and the mastery of the industrial and technical base. On the average the output per enterprise of the machinery industry is increasing 2-fold by 1937 in comparison with 1932; the proportion of goods produced by new or reconstructed enterprises of all-Union importance will exceed 90 per cent; the average increase in labour productivity for the machinery industry has been set at 85 per cent while labour productivity in the most important new establishments is to exhibit a 2 to 2.5-fold increase and over; it has been planned to decrease the rate of metal consumption by 20 per cent while production costs in the metallurgical departments of machinery plants are also to be decreased considerably; fuel expenditures are to be curtailed more than 25 per cent while substantial reductions are to be made in expenses for raw material and auxiliary materials including fuel.

Of the total saving of 2,125,000,000 rubles to be secured by reducing production costs in the machinery industry in 1937, more than 40 per cent will be accounted for by the increase in labour productivity, about 40 per cent by reduction of material consumption and about 20 per cent by reduction of expenses for administration and management.

The reduction of production costs in the iron and steel in-

dustry has been set at 33 per cent for the Second Five-Year Plan period.

Mastery of the new material and technical base is the condition on which the plan for the reduction of production costs in the iron and steel industry is predicated. The rise in the productivity of labour (by 100 per cent) while allowing for increases in wages ensures a more than 20 per cent decrease in production costs in the iron and steel industry, the total decrease being 33.0 per cent.

The 5 per cent reduction in the rate of consumption of ore in the southern plants and of coke (by more than 18 per cent), of fuel in the open-hearth furnace departments (by about 30 per cent) and of other auxiliary materials (by more than 35 per cent) with the simultaneous reduction in the cost of production of the refractory material departments is to bring about a 9-10 per cent reduction in the production costs of the iron and steel industry.

The improvement in the utilization of equipment, the increase in the proportion of more powerful machine aggregates and plants as well as the stricter enforcement of a regime of economy while at the same time greatly increasing the volume of output of the iron and steel industry result in a more than 5.0 per cent reduction in production costs due to the decrease in overhead, administrative and managerial expenses.

For the coal industry a 32.4 per cent reduction in the cost of production has been projected. In the technical and economic progress mapped out by the Plan for this industry, increasing labour productivity is to constitute the prime factor making for reduced production costs.

The rise in the productivity of labour (by 91 per cent) while allowing for wage increases (of almost 30 per cent) accounts for a 21.1 per cent reduction in the production cost of the coal industry out of a total reduction of 32.4 per cent.

The increase in the average capacity of pits during the Second Five-Year Plan period makes it possible, in conjunction with the sharp decrease in unproductive expenses, to diminish overhead expenses per ton of coal by more than 60 per cent, which means a 7.3 per cent reduction in coal production costs.

The structural changes in the coal-mining districts in the direction of increasing the relative importance of the eastern basins, in which comparatively lower costs of production are

prevalent, result in a 3-4 per cent reduction in the average cost of coal production for the Soviet Union as a whole.

In the timber industry a 17 per cent reduction of production costs has been contemplated. This takes into account the increasing relative importance of stripped and rafted timber as well as the increasing distance timber is to be hauled. If the proportion of stripped and rafted timber as well as the distance the timber is to be hauled remained unchanged, the cost of production in the timber industry would have to be decreased more than 20 per cent.

The improvement in the utilization of equipment is an essential factor in reducing production costs in light industry.

The increase in the proportion of the new, technically advanced establishments from 11 per cent to 40 per cent, the considerable renewal of the equipment of the old establishments (mechanization of laborious processes and introduction of automatic machinery) are very important factors in raising the productivity of labour by 52 per cent. The increase in output per enterprise is largely responsible for the almost 40 per cent decrease in administrative and managerial expenses.

Almost half of the 25 per cent reduction of production costs in the food industry depends on decreasing material consumption (raw and auxiliary materials, including fuel). Besides reducing the raw material consumption rate per unit of output, the elimination of the great losses in the canning, fruit, vegetable, fish, alcoholic beverages and other lines of the food industry provides much room for the reduction of production costs. For the purpose of decidedly improving the quality of output in some branches of this industry (confectionery, macaroni, etc.,) it has been planned to make comparatively small reductions in the expenses to be incurred for raw materials. The cost reduction is to be accomplished exclusively by decreasing losses and overhead expenses.

Of the 25 per cent representing the total reduction of production costs in the food industry, 6.7 per cent are to be accounted for by decreasing expenses for overhead and management.

The Plan maps out a reduction in production costs in the meat industry amounting to 24.5 per cent, in the sugar industry—to 45 per cent, in the canning industry—to 18 per cent, in the vegetable-oil industry—to 15 per cent, etc.

In 1937, 25 per cent of all economies to be effected by reducing production costs in the principal branches of national economy as compared with 1932 will be accounted for by the building industry. The decrease in the cost of production of construction proper in 1937 has been set at 40 per cent in comparison with 1932.

The saving to be effected by the reduction of production costs in construction proper in 1937 as compared with 1932 has been fixed at 8,700,000,000 rubles, according to tentative calculations.

The average reduction in the cost of production of the building industry during all the years of the Second Five-Year Plan (as compared with the level of 1932) is about 18 per cent (with a 40 per cent reduction in 1937 as against 1932). This signifies a saving due to lowered production costs in construction proper for the five years amounting to 17,000,000,000 rubles as compared with 1932, while the saving in industry as a whole totals about 26,500,000,000.

The data cited attest the great importance of the struggle for the reduction of production costs in the building industry during the second quinquennial period.

Of the total reduction in production costs in the building industry amounting to 40 per cent, more than half (21 per cent) must be derived from the diminution of material consumption and transportation expenses. The rates of material consumption and transportation expenses must be reduced 40 per cent. The reduction in the rate of consumption of building materials in conjunction with the appreciable decrease in production costs of the latter at the building industry's own auxiliary establishments, and the increase in the relative importance of motor haulage accompanied by lowered transportation costs constitute essential factors in the reduction of production costs in the building industry. The great improvement in the quality of building materials (cement, etc.) provided for by the Plan is likewise an important element in production-cost reduction in this industry. Of the almost 3,000,000,000 rubles representing the total saving which will result from the better utilization of building materials, a considerable part is being derived from the improved quality of building materials and of the construction work itself.

The growth of the productivity of labour (with allowance for wage increases) is resulting in an 11 per cent decrease of pro-

duction costs in the building industry. Expenses for administration and management are being cut almost in half.

In the building industry the structure of the cost of production is changing in the direction of a relative increase in productive expenses while unproductive expenses are being decreased in 1937 from 17 per cent to 14.7 per cent.

Structure of Production Costs in the Building Industry

Elements in Production Costs	1932	1937
Wages, including social insurance contributions	31.0	32.8
Raw materials and transportation	52.0	52.5
Unproductive expenses	17.0	14.7
Total	100.0	100.0

In individual lines of construction the reduction in the cost of production varies between 30 per cent (in construction for transportation) and 43 per cent (in industrial construction).

III

The reduction of production costs on State farms, the considerable improvement in the quality of output and the decidedly improved utilization of the powerful technical base of agriculture constitute a highly important part of the plan of qualitative indices for the Second Five-Year Plan period.

The high production costs on the State farms during the last two years of the First Five-Year Plan period were due to the still inadequate mastering of the means of mechanization and the considerable increase in expenditures for administration and management.

According to the plan for the reduction of production costs on State farms, expenditures per hectare in 1937 expressed in value are to be reduced 40-45 per cent in comparison with the plan of 1933 which, taking into account the projected yield, must result in a reduction of production costs per centner of grain by more than two-thirds, after deducting the value of waste products.

The reduction in the cost of the power-hour and the fodder unit are very important factors in lowering production costs on the State farms. While increasing the consumption of power-hours per hectare of sowing area, the Second Five-Year Plan provides for a marked reduction in production costs per power-hour. This reduction must be attained by a rise in the coefficient

of utilization of the tractor fleet, by the proper organization of repair work, by a 3.5-fold increase in labour productivity accompanied by an almost 50 per cent increase in wages, by a reduction in the rate of fuel consumption and by the shift to cheaper fuel in conjunction with an improvement in its quality.

The shift in the construction of the powerful caterpillar tractors from carburetter engines to Diesel engines is of vast importance.

The reduction in the expenses incurred by State farms for general economic and general production purposes, which has been fixed at 30 per cent in comparison with the plan of 1933, is also an essential factor in lowering expenses per hectare.

The 1930 and 1931 data available for a number of State farms indicate that in individual big advanced State farms marked progress has already been made in reducing production costs. Thus on the Model Instructional State Farm (Northern Caucasus) the cost of producing one centner of spring wheat in 1930 was 6.48 kopeks, on the Giant State Farm—4.69 kopeks, on the Lenin State Farm (Middle Volga)—6.49 kopeks and on the Borissov State Farm (Siberia)—5.17 kopeks, etc. The cost of producing one centner of winter wheat on the State grain farms was 5 rubles 80 kopeks in 1929, while in 1930 it was 5 rubles 90 kopeks.

The necessity of lowering the cost of production per centner of grain by two-thirds is dictated by the organizational and economic tasks facing the State farms during the Second Five-Year Plan period. The reduction in the production cost per centner of grain to the extent indicated reflects the struggle for higher yield, for the socialist organization of labour, for the curtailment of inflated overhead and managerial expenditures.

The decrease in the production cost of fodder on the State stock farms, accompanied by a simultaneous increase in the feed ration and a shift in the main to organizing fodder bases of their own on these farms, is a highly important factor in the reduction of their production costs.

By raising the milk yield to more than double the level of 1932, the cost of production per litre of milk is being lowered more than 45 per cent in 1937.

The reduction in the production cost per unit of fodder and the change in its structure, the increase to 10.2 in the number

of pigs saved per litter (total number of pigs saved divided by sows farrowed), and the decrease in death losses in the litter by more than two-thirds as well as the increase of 41 kilograms in the weight on hoof of hogs delivered for meat are salient factors in the reduction of production costs of pork on the State farms by 75% as compared with the 1932 level.

Throughout the entire system of the People's Commissariat of State Farms, the total reduction in the cost of producing grain and livestock products is to yield a saving of over 1,600,000,000 rubles in 1937, and of about 4,000,000,000 rubles for the entire Second Five-Year Plan period.

Besides the vast growth of labour productivity in agriculture and a sharp reduction in production costs on the State farms, the Second Five-Year Plan projects considerable structural and qualitative changes in agricultural production. The notable improvement in the quality of agricultural production must be achieved hand in hand with a pronounced increase in labour productivity and decrease in expenditures per unit of output.

The qualitative gains in agriculture constitute important preconditions of the qualitative improvement planned for the assortment of commodities in the various branches of light industry, and are a vital factor in the marked improvement to be achieved in the quality of food products.

The increase in the proportion which wheat forms of the gross amount of food crops harvested, from 48.0 per cent in 1932 to almost 59.0 per cent in 1937, and the growing share of leguminous crops among farinaceous products, from 21.7 per cent to 43.0 per cent, etc., in their totality result in a sharp qualitative improvement in the output of the flour industry, in bread baking, in the cereal products and a number of other important branches of the food industry. The change in the structure of the stock and in the quality of the cattle is having a great effect also on the meat industry. The increase in the proportion of fine and semi-coarse wool, etc., determines to a considerable extent the qualitative changes in the assortments of the textile industry.

Sharply decreased production costs and considerably improved quality of output are most important conditions for the transformation of the State farms into highly profitable enterprises.

IV

The average reduction in costs per ton-km. for all systems of transportation (except horse-drawn) has been set at 40 per cent for the Second Five-Year Plan period. This considerable reduction is being determined in the main by the decrease in costs per ton-km. in the new modes of transportation. Thus, in motor haulage the reduction in costs is to be 54 per cent, in airway transportation—more than 70 per cent, while costs per ton-km. of railway shipments are undergoing a reduction of 10.5 per cent, and of waterway shipments—36.0 per cent.

Expenses of Transportation

Systems of transportation	1932	1937	Decrease in 1937 in % of 1932
Railway transportation (ton-km. in kopeks)	1.371	1.227	10.5
Maritime transportation (ton-miles in kopeks)	1.180	0.780	33.9
River transportation (ton-km. in kopeks)	1.395	0.877	37.1

The projected technical and production indices of the work of the railway transportation system requires a 43 per cent increase in labour productivity (wages increasing 23.2 per cent) while the fuel consumption is to be decreased appreciably.

The increase in the productivity of labour which is planned to exceed the increase in wages (the latter constituting 68.9 per cent of transportation costs) ensures an 8.5 per cent decrease in these costs. The lowered fuel consumption rates also contribute to the reduction in costs, while the diminution of 13.4 per cent in miscellaneous expenses for materials and overhead enables cost to be reduced by 1.9 per cent.

Depreciation is a substantial element in production costs in railway transportation, constituting 17.5 per cent of these costs. While the rate of depreciation is being lowered from 4.7 per cent to 4.5 per cent, the rate of increase of the depreciation fund will be in excess of the rate of increase of the freight turnover due to the rapid growth of the fixed capital by 1937 in comparison with 1932. This circumstance leads to a 5.9 per cent increase in depreciation per unit of production, or to a 1.0 per cent increase in production costs per ton-km.

As a result of this factor, a 10.5 per cent cost reduction in railroad freight shipments has been projected which signifies a decrease in costs per ton-km. from 1.371 kopeks in 1932 to 1.227 kopeks in 1937 (reduced to a common basis). It is calculated that the saving to be achieved in 1937 by reducing railroad transportation costs will be 591,400,000 rubles, while for the entire Five-Year Plan period this sum will be approximately 1,100,000,000 rubles as compared with the 1932 level. A decided improvement in the quality of repair work to the rolling stock and in the service provided by the transportation system for its customers is an indispensable condition of the reduction of operating costs in transportation.

The rise of labour productivity and the lowering of operating costs in railway transportation depends also on the qualitative advance secured in the various branches of the machinery industry manufacturing transportation equipment. The increase in the average load capacity of freight cars from 29 tons to 47 tons, the rising proportion of dumping cars from 20.8 per cent to 43 per cent, in 2-axle equivalents, etc., denote a tremendous saving in labour power and a considerable reduction in material consumption, particularly of fuel per unit of production.

The electrification of the railroads (introduction of electric locomotives, multiple-unit system) by decidedly improving the conditions of exploitation (the experience on the Suram Pass has shown that a weight of one ton on the drivers of an electric locomotive is equivalent to the weight of 1.7 tons on the drivers of a type "E" steam locomotive, while the electric locomotive at the same time develops a speed twice as great as the speed of steam locomotives) correspondingly reduces the number of locomotives and cars required to transport the same quantity of freight. Besides, electrification is a factor making for economy in fuel consumption (the fuel consumption per 1,000 ton-km. while going uphill on a 0.9 per cent grade is 103 kg. for an electric locomotive, but 248 kg. for a steam locomotive), for a decided diminution of expenses for water supply, etc.

The Diesel locomotives being manufactured during the Second Five-Year Plan period are likewise more economical and consume one-fourth the quantity of fuel required by steam locomotives. An additional great advantage in the use of Diesel locomotives is the fact that no water is required to operate them

which is of particularly great importance in arid regions (Central Asian railroads).

The substantial increase in the length of freight hauls in waterway transportation and the rising proportion of Diesel motor boats in the fleet create preconditions for considerably higher rates of increase in labour productivity and of a greater reduction in production costs in waterway shipments than in railway shipments. However, while all the essential prerequisites for lower waterway transportation costs were present, the operating costs of the latter in 1932 differed only to an inconsiderable measure from the operating costs of railway transportation. Thus the cost of transportation per ton-kilometre of river cargo was 1.39 kopeks in 1932 while maritime cargo cost 1.18 kopeks per ton-mile. In 1937 the cost per ton-kilometre of river transportation must be reduced to 0.88 kopeks and that of maritime transportation to 0.78 kopeks per ton-mile, which will signify a 36 per cent decrease in waterway transportation costs in comparison with 1932, yielding a saving of 434,400,000 rubles in 1937 and of about 1,000,000,000 rubles for the entire Five-Year Plan period. Reduction of automobile transportation costs is being effected by a pronounced improvement in the utilization of the available automobiles. The use factor of motor vehicles is rising from 48 per cent to 75 per cent.[1]

The average daily run is increasing from 125 km. to 140 km. while the run with load is rising from 75 per cent to 90 per cent.

On the basis of these technical and economic indices there has been planned a 70 per cent increase in labour productivity for motor haulage during the Second Five-Year Plan period, a considerable reduction in expenditures for current repairs, while improving their quality and achieving a more efficient utilization of fuel and other auxiliary materials.

The circumstance that the rates of increase of wages are being surpassed by the rates of increase of labour productivity, and the reduction in material consumption, particularly in expenses of administration and management, make it possible to decrease motor transportation costs per ton-kilometre by 54 per cent.

While the freight turnover accounted for by motor vehicles is

[1] The ratio of the number of machines in operation to the total number of machines in the automobile fleet.

rising to 16,000,000,000 ton-km. in 1937. *i.e.*, 15-fold, the saving of 40 kopeks per ton-kilometre will result in economies totalling 6,400,000,000 rubles for the last year of the Second Five-Year Plan period.

Better utilization of the automobile fleet, improvement in the quality of repair work, increasing the skill and raising the cultural level of the chauffeurs as well as transition to the system of attaching steady operating personnel to each car are the principal conditions on which improved quality of work in the motor transportation system depends.

Tentative calculations indicate that if the indices of utilization of automobiles were maintained at their 1932 level, it would require at least twice the number of automobiles specified for 1937 to fulfil the Plan of trucked shipments for that year (*i.e.*, about 750,000 trucks instead of 373,000 trucks).

The intensive development and the mastery of airway transportation ensure a reduction in the operating costs of aeroplane shipments to less than one-third per ton-kilometre.

The saving to be effected as a result of lowered transportation costs has been calculated to exceed 7,400,000,000 rubles in 1937 for all systems of transportation.

Transportation expenses are a very important item in total production costs in the national economy of the U.S.S.R. Calculations show that in the principal branches of national economy expenditures for transportation of freight (exclusive of intra-plant transportation) due to the reduction in operating costs despite the great increase in freight shipments and in commodity output will increase in 1937 at rates considerably below those of the rates of increase in freight shipments.

This is explained by the notable reduction in operating costs per unit of shipment for every mode of transportation and by the change in the structure of shipments. According to the Plan transportation expenses (at operating costs) are to be reduced more than 40 per cent per unit of output in national economy at the end of the Second Five-year Plan period, which will mean an approximately 6-7 per cent reduction in the cost of production per unit of output in the principal branches of national economy. In addition to effecting economies in transportation expenses (saving approximately 7-8,000,000,000 rubles) the displacement of horsedrawn transportation by more modern methods of conveyance makes it possible to accelerate the pro-

cess of production and circulation and thereby facilitates the reduction of production costs and expenses of circulation in trade.

V

In the two trading systems—the consumers' co-operative organizations and the State trading system—expenses of circulation totalled about 3,000,000,000 rubles in 1932. Each per cent of reduction in the expenses of circulation in 1932 was equal to 30,000,000 rubles, while in 1937 each per cent will be equal to more than 65,000,000 rubles. Circulation expenses in percentage of net turnover, according to the data of the All-Union Co-operative Association, amounted to 13.2 per cent in 1932 throughout the consumers' co-operative system (exclusive of the Workers' Supply Departments). According to the statistical data for 1932 the expenses of circulation in per cent of the net turnover for the State trading system (Chief Board of State Trade) amounted to 7.3 per cent. However this percentage cannot be compared with circulation expenditures in the consumers' co-operative system for the following reasons: 1) there is a greater proportion of manufactured goods, corn spirits, and other commodities which require a relatively small amount of labour in the assortment of the State trading system than in the assortment of the consumers' co-operative system; 2) in the State trading system the proportion of rural commodity circulation is much less than in the consumers' co-operative system, and finally 3) prices in the State trading system, which in 1932 disposed of almost the entire volume of commodities to be sold at commercial prices, are higher than in the consumers' co-operative system.

The general 26 per cent reduction in the expenses of circulation in the system of consumers' co-operative organizations and the systems of State trading (State Wholesale and Retail Trading Association and State Retail Trading Association) is based on a reduction in all principal expenditures per unit of output except expenses for packaging, preliminary handling for sale and sorting (expenditures for materials) the object of which is to improve consumer service.

It must also be taken into account that the principal factors upon which the reduction of circulation expenses depends are at the same time factors making for the improvement of consu-

mer service. The improvement in assortment and quality of commodities accelerates the rate of circulation of the latter.

The elimination of cross-haul shipments, the more extensive use of trucks in the transportation of commodities, the mechanization of laborious processes in trading, etc., also contribute to improving consumer service and lead to a reduction in circulation expenses.

The 18 per cent decrease in transportation expenses is an essential factor in the reduction of circulation expenses. The volume of merchandise transported by the consumers' co-operative organizations in their own vehicles, both motor and horse-drawn, is increasing more than 2-fold. Trucking is to show a 4 to 5-fold increase. The growth of waterway shipments, the concentration of commodity streams and the decrease in cross-haul shipments also constitute important elements in the reduction of the expenses of circulation.

The considerable increase in the rate of turnover per person employed in the trading systems, with wages being increased, is responsible for almost one-half of the extent to which circulation expenses are being cut.

There is to be a very severe retrenchment in expenses for management and administration.

All these factors must more than countervail the effect produced on the general level of circulation expenses by the increase in the relative importance of the rural districts in commodity circulation (especially in the consumers' co-operative organizations), the decrease in the number of commodities sold only once within stated periods (attendant upon the abolition of rationed supply, etc.), the lower proportion of corn spirits consumed, etc. At the same time the change in the structure of commodity circulation in the direction of a decrease in the relative importance of commodities requiring much labour and transportation must react favourably on the average level of expenditures.

Thus the improvement in the quality of work of the commodity-conveying system actually yields greater economies than those specified in the plan for the reduction of expenses of circulation.

The total saving to be effected by the reduction of the expenses of circulation in the State trading and consumers' co-operative systems in 1937 has been set tentatively at 1,665,000,000 rubles, and for the entire period of the Second Five-Year Plan at approximately 3,500,000,000 rubles in comparison with the 1932 level

of expenses, while it has been made compulsory to sharply improve the quality of consumer service on the basis of widely developing Soviet trade carried on in a cultural manner.

VI

In the principal branches of municipal service an average reduction of 22 per cent in production costs has been contemplated. The cost of producing electric current is to be decreased from 10.3 kopeks to 7.8 kopeks per kilowatt hour. The cost of production of a cubic metre of water is to be cut 20 per cent (from 13.1 kopeks to 10.5 kopeks) while that of a car-kilometre in street car transportation is to be lowered by 24 per cent.

As in industry, so in the principal branches of municipal service, the structure of production costs is undergoing a change in the direction of an increase in the proportion of material consumption and of depreciation, while unproductive expenses are to be sharply curtailed and wages are to exhibit a certain proportionate decrease.

Production costs of the artisan and handicraft co-operative organizations must be reduced by 19 per cent. Besides the fact that the very conception of production costs in the artisan and handicraft co-operative system must be given a very qualified meaning, calculations to ascertain the elements entering into the reduction are greatly complicated because of the lack of statistical data that could be relied upon to any extent. However very rough calculations show that the economies to be effected in the artisan and handicraft co-operative organizations by better utilization of raw materials, increase in labour productivity and decrease in overhead expenses total almost 2,000,000,000 rubles for the last year of the Second Five-Year Plan period. This undoubtedly is one of the highly important factors in the realization of the Soviet price policy and the growth of socialist accumulation. At the same time the quality of output of the handicraft co-operative organizations must be greatly improved and thus become an effective lever for raising the well-being of the toilers.

* * *

The scale on which it is planned to improve quality during the Second Five-Year Plan period will become plain by a comparison of the following two magnitudes. Capital investments in

all branches of national economy during the Second Five-Year Plan period exceed those of the First Five-Year Plan period by 83,000,000,000 rubles. The economies to be achieved by the reduction of production costs in the principal branches of national economy, with quality of output greatly improving, alone constitute 70,000,000,000 rubles during the years of the Second Five-Year Plan period. Thus the improvement in the qualitative indices alone suffices to cover by far the greater part of the increase in capital investments.

Lowered prices based on the reduction of the cost of production and circulation to be accompanied by an improvement in the quality of output are a most important factor in the 2 to 3-fold growth of consumption during the Second Five-Year Plan period.

The plan for the reduction of production costs in the principal branches of national economy, and for the decrease of the expenses of circulation in the consumers' co-operative and State trading systems, to be effected in conjunction with a decided improvement in the quality of output and consumer service, testifies to the vast internal resources of socialist economy.

The fulfilment of this plan must constitute one of the cardinal tasks of the second quinquennial period.

COMMODITY CIRCULATION

I

THE vast increase in industrial and agricultural production, the further growth of the national income, placed wholly at the disposal of the toilers, and the abolition of the remnants of parasitic consumption ensure all the prerequisites for the radical improvement in the living conditions of the workers and the peasant masses and the rapid growth of their welfare during the Second Five-Year Plan period.

The planned rates of increase in the output of manufactured goods of general consumption and of foodstuffs are a guarantee that the decision of the Seventeenth Congress of the Communist Party to ensure a 2 to 3-fold increase in the supply of the principal consumers' goods, including foodstuffs, to the population in comparison with the end of the First Five-Year Plan period will be carried into effect. The 2.5-fold increase in retail commodity circulation and the considerable expansion of the trading network in city and country in turn create every possibility for paving the way to the abolition of the rationed issue of commodities on the basis of going over to widely developed Soviet trading.

The commodity production of industrial goods manufactured by State industry, inclusive of food products, is rising (in fixed trust selling prices of 1932) from 14,500,000,000 rubles in 1932 to 34,200,000,000 in 1937, *i.e.*, to 235.5 per cent of the 1932 figure.

The commodity production of goods for general consumption produced by artisan and handicraft co-operative organizations is growing from 5,600,000,000 rubles in 1932 to 11,500,000,000 rubles in 1937, *i.e.*, to 206 per cent of the 1932 figure.

During the Five-Year Plan period the commodity production of manufactured goods for general consumption is increasing in national economy as a whole to 227.3 per cent of the 1932 figure.

The following data indicate the increase for individual commodities: (See table p. 496.)

The increase in the output of industrial commodities of general consumption is to be accompanied by an improvement in quality and by a larger assortment. The Plan provides for an improve-

Classification of products	1932	1937	1937 in % of 1932
Cotton fabrics (million metres)	2,719.7	5,100.0	187.5
Woollen fabrics (million metres)	94.6	226.6	239.5
Linen fabrics (exclusive of technical fabrics and sacking, in million metres)	30.0	322.6	1,075.3
Needle-trades products (million rubles, in trust selling prices of 1932)	2,291.7	4,700.0	205 0
Knit goods (million rubles, 1932 prices)	619.7	2,270 0	366.3
Leather footwear (million pairs)	82.0	180.0	219.5
Soap, in 40 per cent fatty matter equivalent (thousand tons)	357.2	1,000.0	280.0
Matches (million cases)	5.6	12.0	214.2
Furniture (million rubles, in 1932 prices)	172.0	506.7	294.6
Metal manufactures (million rubles, in 1932 prices)	911.0	2,300.0	252.6
Fancy goods (million rubles, in trust selling prices of 1932)	490.4	1,365.0	278.3

ment in the quality of cotton fabrics, a rise in the proportion of fine cloth and worsted goods in the manufacture of woollen fabrics and an improvement in the quality of shoes, soap and other commodities.

The Plan specifies a great increase in the output of a variety of household and cultural goods, the demand for which is showing marked increase as a result of the rise in the material and cultural level of the workers and collective farmers. Thus the manufacture of bicycles is growing 4.5-fold, of phonographs —26-fold, of watches and clocks—4.8-fold and of musical instruments—6-fold. There is to be a considerably richer assortment in all groups of commodities; provision is made for the development of large-scale production of quite a number of commodities which Soviet factories either did not produce altogether or produced in small quantities (electric heating and refrigerating apparatus, vacuum cleaners, high-grade photographic apparatus, etc.).

While the increase in the total commodity production of manufactures of general consumption amounts to 227.3 per cent of 1932, the proportion of such goods consumed outside the market is to rise only 38.4 per cent. The proportion of this non-marketed section of the commodities produced is in consequence decreasing from 26.6 per cent in 1932 to 16.2 per cent in 1937, while the marketed share of manufactures for general consumption is increasing to 260 per cent of 1932, *i.e.*, more than 2.5-fold.

II

The commodity production of agricultural foodstuffs is also growing rapidly, being accompanied by a simultaneous rapid increase in personal consumption on the part of the collective farmers.

The commodity production of the principal products of agriculture is increasing as follows:

Classification of products	1932	1937	1937 in % of 1932
Grains (million tons)	19.85	34.5	173.8
Potatoes (million tons)	8.98	16.4	182.5
Vegetables and melons (million tons)	4.19	8.7	208.1
Meat (dressed carcass weight, in thousand tons)	935.0	2,484.0	265.7
Milk and dairy products (in terms of milk, in thousand tons)	4,088.0	9,637.0	235.7

This commodity output is being realized during the Second Five-Year Plan period along the lines established before the beginning of this period as follows: obligatory deliveries made to the State of the most important foodstuffs and payments in kind for work done by machine and tractor stations; decentralized procurements by various co-operative and State organizations, and collective farm trade.

However, substantial changes are taking place in the relative importance of the various forms in which the commodities produced are being realized. Due to the rising output of the various systems of State farms and the growing payments in kind to the machine and tractor stations, there is an absolute and relative decrease in the proportion which obligatory deliveries to the State form of the total volume of agricultural products received by the State.

According to the specifications of the Second Five-Year Plan, collective farm trade is also scheduled to undergo considerable growth. Inasmuch as the geographic distribution of the surpluses of agricultural production does not coincide with the geographic distribution of the consuming centres, a considerable portion of the agricultural products realized by the collective farms and the collective farmers in collective farm trade is being acquired by

various State and co-operative organizations by developing the system of decentralized procurement.

The development of decentralized procurement, in which the closing of long-time contracts with collective farms and collective farmers must become one of the most important forms, and the acquisition of products in remote localities serve at the same time as powerful means of fighting for a reduction of the food prices prevailing on the city markets.

The following data give the projected volumes of the most important products to be received by the State and the products entering into collective farm trade (in thousand tons):

Classification of products	Years	State receipts (amounts received as taxes, payments in kind to machine and tractor stations, output of State farms)	Procurements from suburban agricultural enterprises	Collective farm trade (inclusive of decentralized procurement)	Totals
Grains	1932	18,938	—	917	19,855
	1937	30,000	—	4,500	34,500
1937 in % of 1932		158.4	—	490.8	173.8
Meat	1932	680.4	31	223.6	935
	1937	1,334	247.5	902.5	2,484
1937 in % of 1932		196.1	798.4	403.6	265.7
Dairy products in terms of milk	1932	2,100	246	1,742	4,088
	1937	5,841	770	3,026	9,637
1937 in % of 1932		278.1	313	173.7	235.7
Potatoes	1932	4,642	343	3,999	8,984
	1937	7,620	1,440	7,340	16,400
1937 in % of 1932		164.2	419.8	183.5	182.5
Other vegetables and melons	1932	1,673	1,546	968	4,187
	1937	1,500	4,800	2,413	8,713
1937 in % of 1932		89.6	310.5	249.3	208.1

The structure of the State receipts of the most important food products is to be as follows:

Grains: The Plan provides for an increase in the State receipts of grains of from 18,900,000 tons, the amount obtained

from the harvest of 1932, to 30,000,000 to be obtained from the harvest of 1937, a 58.4 per cent increase.

During the first years of the Second Five-Year Plan period a great part of the grain resources is scheduled to be received by the State in the form of obligatory grain deliveries.

At the same time, due to the circumstance that all collective farms are being embraced in the operations of the machine and tractor stations, there is to be an increase in the receipts from the collective farms in the shape of payments in kind for work performed by the machine and tractor stations.

In addition to the obligatory grain deliveries to the State it is contemplated that the State purchase grain from the collective farmers. The proportion of the State grain receipts in the commodity grain production is to recede somewhat inasmuch as the Plan provides for a considerable increase in the collective farm grain trade.

The quantity of grain to be received by the State ensures the complete satisfaction of the growing demands of the non-agricultural population, the grain supply for the collective farm peasantry in the specialized non-grain agricultural districts (cotton, flax, etc.) and the requirements of industry and export as well as the setting up of a considerable State reserve.

Meat: The quantity of meat to be received by the State is increasing from 680,400 tons in 1932 to 1,334,000 tons (dressed carcass weight, inclusive of offal) in 1937.

The meat to be delivered to the State in 1937 will constitute 54 per cent of the total commodity production; besides this quantity the suburban farms will supply 247,500 tons of meat in 1937 as against 31,000 tons in 1932, or 10 per cent of the commodity production.

The collective farm meat trade has been set at 902,500 tons in 1937 as against 223,600 tons in 1932, which will yield an increase of 303.6 per cent.

A considerable portion of the meat which is to pass through collective farm trade channels must be secured through decentralized procurement.

Milk and dairy products: The centralized resources of milk and dairy products are increasing from 2,100,000 tons in 1932 to 5,841,000 tons in 1937, or by 178.1 per cent. The centralized resources are composed of the commodity production of the State farms which is increasing from 484,000 tons in 1932 to 1,720,000

tons in 1937, of obligatory deliveries derived from unsocialized cattle of the collective farmers and of the obligatory deliveries of the collective stock farms. In addition to this the suburban farms will supply 770,000 tons in 1937 as against 246,000 tons in 1932, a more than 3-fold increase. In 1937 obligatory deliveries of milk and dairy products and receipts from suburban farms will total 6,611,000 tons in 1937, or 68.6 per cent of the total commodity production of milk.

Potatoes: The centralized potato resources are increasing from 4,642,000 tons in 1932 to 7,620,000 tons in 1937, *i.e.*, by 64.2 per cent, constituting 46.5 per cent of the commodity output in 1937. Almost the entire potato supply will be received from the collective farms which will account for 6,870,000 tons while the State farms will account for 750,000 tons. The State will obtain its potato supply from the collective farms both in the form of obligatory deliveries and of payments in kind to machine and tractor stations. According to tentative calculations deliveries to machine and tractor stations as payments in kind for services rendered will constitute not less than 3,000,000 tons of potatoes. Besides, suburban farms will yield 1,440,000 tons of potatoes in 1937 as against 343,000 tons in 1932.

The planned volume of commodity production and the centralized resources of potatoes ensure an adequate supply of this vegetable for the growing individual as well as industrial requirements (alcohol industry, etc.) in conformity with the projected rates of increase of the corresponding branches of industry.

III

The commodity resources of the State and co-operative retail trade consist of the following:

a) The volume of manufactured goods of general consumption produced by State industry, inclusive of local industry, and by artisan and handicraft co-operative organizations, the portion of such goods consumed outside of the market being excepted.

b) The centralized food resources made available for the population by the socialized retail trading system and the system of public catering;

c) The production of the suburban farms of the consumers' co-operative organizations and Workers' Supply Departments of industrial enterprises, as well as the farm products procured by

decentralized methods, by the co-operative and State organizations on collective farms and from collective farmers.

The entire volume of retail State and co-operative trade (inclusive of public catering but exclusive of tobaccos and alcoholic beverages) is increasing during the Five-Year Plan period in retail prices of 1932 from 31,900,000,000 rubles in 1932 to 80,000,000,000 rubles in 1937. If tobaccos and alcoholic beverages are included, the retail trade is increasing in prices of 1932 from 40,300,000,000 rubles in 1932 to 92,500,000,000 in 1937, or to 229.5 per cent of 1932.

For individual groups of commodities the rates of increase of the retail trade turnover assume the following dimensions:

Indices	In comparable retail prices of 1932 (million rubles)		1937 in % of 1932
	1932	1937	
1. Manufactured goods for general consumption	16,970	44,120	260.0
of which:			
a) Woven goods clothing and footwear	11,500	30,100	261.7
b) Household goods and utensils	2,490	6,750	271 1
c) Soap and perfume y	1,040	2,860	275.0
d) Books and supplies for cultural purposes and sport	1,130	3,230	285 8
e) Miscellaneous manufactured goods . .	810	1,180	145.7
2. Foods	10,145	23,180	228.5
of which:			
a) Principal foodstuffs (bread, meat, dairy products, eggs, fats, suga , confectionery, fish, canned goods, etc)	8,045	17,900	222 5
b) Miscellaneous foods	2,100	5,280	251.4
Sub-total (1 and 2)	27,115	67,300	248.2
3. Public catering	4,800	12,700	264.6
Total (exclusive of tobaccos and alcoholic beve ages)	31,915	80,000	250 7

In addition to the vast increase in the volume of commodity circulation, a considerable improvement is being achieved in its structure due to the increase in the percentage of the principal manufactured goods for general consumption and foods.

The great increase in the volume of retail trade makes it possible to plan that during the second five-year period the levels

of material welfare of workers and of collective farmers be brought considerably closer together and thus take a great stride in the direction of overcoming the age-old contrast between town and country.

The following rates of increase in the retail turnover of State and co-operative trade in town and country have been set by the Plan:

	1932 (billion rubles)	1937	1937 in % of 1932
Total volume of trade	31.9	80.0	250.7
of which:			
Town	23.1	55.1	238.9
Country	8.8	24.9	281.4
Rural volume of trade in % of total	27.7	31.1	—

All commodity groups, especially household goods and cultural supplies which ensure a pronounced upward trend in the cultural level of the collective farm masses, are planned to show a more intensive growth in rural commodity circulation. The decided increase in foodstuffs as an item of rural commodity circulation provides a broader base for supplying the non-agricultural population living in rural districts and the population of the specialized non-grain agricultural districts with the basic items of food, and ensures increased consumption of sugar, confectionery and canned goods on the part of the collective farmers.

Simultaneously with the development of State and co-operative retail trade during the Second Five-Year Plan period, there is to be a considerable rise in collective farm trade, one of the most important channels for supplying food products to the urban and the non-farming population living in rural places. The rise in collective farm trade must be accompanied by a vast development of the operations of various State and co-operative organizations engaged in the decentralized purchase of food products from collective farms and collective farmers.

IV

The total volume of foodstuffs designated for consumption by the agricultural and non-agricultural population (excepting requirements for export, stock-raising and other non-consumptive purposes) is exhibiting the following increases in the course of the Second Five-Year Plan period:

Kinds of products	1932	1937	1937 in % of 1932
Grain (million centners)	372.6	464.7	124.7
Meat (thousand tons)	2,707 0	5,886.0	217.4
Fish (thousand tons)	1,140.0	1,840.0	161.4
Milk and dairy products (in terms of milk, in thousand tons)	18,551.0	30,285.0	163.3
Confectionery (thousand tons)	570.0	1,343.2	235.6
Vegetable oil and oleomargarine (thousand tons)	461.7	748.0	162.0
Potatoes (thousand tons)	22,283 0	28,062.0	125.9
Other vegetables and melons (thousand tons)	16,874.0	28,062.0	166.4
Egg (millions)	4,096 0	11,940.0	291.5
Sugar (thousand centners)	8,734 0	23,000.0	263 3
Canned goods (million cans)	283.4	1,250.0	441.1

In addition to the quantitative increase in available foodstuffs there is to be a marked rise in the proportion of the most valuable and wholesome foods (meats, dairy products, fats, eggs, sugar).

The rising proportion of wheat flour (from 43 per cent in 1932 to 70 per cent in 1937) together with the considerable improvement in the quality of wheat and rye flour; the growing proportion of pork in the total of meat products (from 25.5 per cent in 1932 to 48.6 per cent in 1937), of poultry and rabbits (from 6.2 per cent in 1932 to 13.2 per cent in 1937); the proportionately increasing quantities of fresh and canned fish consumed and the diminishing share of salt fish; the enlargement of the supply of the most readily digested kinds of vegetables and of those richest in vitamins (tomatoes, cauliflower, lettuce, legumes), the increase in the consumption of fresh vegetables, etc., all characterize the pronounced qualitative improvement in the food consumption structure during the period of the Second Five-Year Plan.

Consumption rates of the most important food items (meat, fats, fish, eggs, sugar, etc.) are increasing 2.5-fold on the average during the Five-Year Plan period. The consumption of bread and of potatoes and other vegetables is growing more slowly because at the beginning of the Second Five-Year Plan period they already exhibited high rates of consumption.

In 1937 the per capita rate of consumption of food products in town and country will be as follows (in kilograms per person per year):

Flour	198.5
Cereal products	21.2
Potatoes	156.8
Other vegetables	156.8
Vegetable oil a .d oleomargarine	4.2
Sugar	12.86
Milk and dairy products in terms of whole milk	169.3
Eggs (*single count*)	67.3
Meat	32.9
Fish	10.3
Canned goods	7.0
Confectionery	7.6

The more than 2.5-fold (259.4 per cent) increase in the volume of manufactured goods for general consumption intended for the market during the Second Five-Year Plan period ensures a vast rise in the per capita consumption rate of all manufactured goods.

The per capita rate of consumption of the principal manufactured goods will be as follows:

	Units of measurement	Per capita in 1937
Cotton fabrics	metres	26.83
Woollen fabrics	"	1.27
Linen fabrics	"	2 13
Knit goods	rubles	12 87
Leather footwear	pairs	1 00
Rubber footwear	"	0.56
Household soap	kg.	4 60
Toilet soap	"	0 39
Kerosene	"	15.00

The more rapid increase in the consumption of industrial goods by the collective farmers brings the levels of consumption of the workers and collective farmers nearer to each other.

The considerable reduction in production costs in all branches of national economy and the decrease in the expenses of distribution in Soviet trade are establishing a basis for lowering the general retail price level.

The Plan provides for a 35 per cent reduction in the general retail price level of 1933 in State and co-operative trade, comprising a 34.1 per cent reduction in urban trading and a 36.6 per cent price reduction in rural trading. The decrease in the prices of public catering products has been set at 15 per cent.

It is projected to lower the prices of foodstuffs and manufactured goods as follows (in percentages):

	In town	In country	Total
Foodstuffs	35.2	32.0	34.5
Manufactured goods for general consumption	33.1	38.1	35.3
of which:			
Products of handicraft and co-operative organizations	36.1	36.0	36.1

The reduction of retail prices is one of the most important levers for raising the standard of the material well-being of the workers and collective farmers.

The task of lowering prices in State and co-operative trade is intimately connected with the change in prices on the collective farm markets.

The sharp reduction of foodstuff prices on the collective farm markets is a condition on which the lowering of rural co-operative and State trade prices to the level of city retail prices depends. The 36.6 per cent reduction in rural retail prices must be accompanied by a reduction in the prices of agricult ral products on the collective farm markets to ⅓-¼ of the 1932 price level.

The completion of collectivization, the organizational and economic consolidation of the collective farms, the transformation of the collective farmers into active builders of socialist society, the vast increase in the quantity of manufactured goods offered for trade in the countryside and the entrenchment of the system of conventional prices in decentralized procurements are powerful means of lowering market prices, of combating profiteering tendencies, of finally eradicating elements engaged in speculation.

The sale of foodstuffs at commercial prices which is being developed at the present time has already had a very healthy effect on collective farm market prices. The further development of unrationed State trade in foodstuffs and the general reduction of prices for these products while the State has huge stores of foodstuffs in its possession, the development of decentralized procurements by co-operative and State organizations at conventional prices in remote places, the conclusion of long-term contracts with collective farms and collective farmers by co-operative and State organizations and the activization of the work of the rural co-operative system in the purchase of agricultural products operate in the direction of a sharp reduction of market prices.

V

The expansion of the retail trade network and the improvement in its work constitutes one of the most important conditions of the vast development of Soviet trade.

The resolution of the Seventeenth Congress of the Communist Party points out that in order to develop commodity circulation and further improve the supply of manufactured goods and agricultural products to the toiling masses of the countryside it is necessary to ensure "a 37 per cent increase in the retail State and co-operative trading system and its simultaneous technical reconstruction."

The development of the network of socialized trade was marked by considerable success during the First Five-Year Plan period. During the last two years of this period the number of stores increased 72 per cent in the State and co-operative trade systems, mounting from 172,100 trade units on Jan. 1, 1931, to 295,600 units (exclusive of the collective farm trade system) by January 1, 1933. But while major successes may be registered with regard to the quantitative growth of socialized retail stores, very little has been done so far with regard to the proper geographic distribution of the stores, their specialization and technical reconstruction, the introduction of cultural methods of trading on the part of the trading organizations. Therefore the further enlargement of the retail network under the Second Five-Year Plan must be closely interlinked with its technical reconstruction, the rationalization of the processes of trading, the specialization of stores and the radical improvement of service to the consumer. The principal measures to be adopted by the trading system in this field include the following:

a) Extensive introduction of mechanization in the retail trade system and the standardization of store equipment;

b) Compulsory introduction of the practice of preliminary packaging and weighing out of commodities and of selling merchandise by the piece;

c) Considerable extension of the system of home delivery of merchandise in large cities and workers' settlements;

d) Further development of the system of itinerant trading, primarily to serve collective farmers during field work seasons as well as sparsely settled places without stationary stores, suburban settlements, etc.;

e) Organization of the systematic study of consumer demand and the assorting of merchandise in conformity with the growing, increasingly complex requirements of the workers and collective farmers, giving due heed to the specific conditions obtaining in the individual districts, particularly the special needs of the national districts;

f) Radical reform of the methods used in serving customers, introducing cultural methods in Soviet trading in all links of the trading apparatus.

The retail network of socialized trade comprising all trading organizations exclusive of collective farm stores is growing from 295,600 units on January 1, 1933, to 405,000 units on January 1, 1938, *i.e.*, a 37 per cent increase, of which: city stores—35.5 per cent and country stores—38.2 per cent. As the volume of retail trade is increasing at a more rapid rate, the commodity turnover per trading unit for the Five-Year Plan period is rising 64 per cent on the average.

At the present time the stores in the trading system, especially in the countryside, are not as evenly distributed by districts as is necessary. This gives rise to a number of unfavourable phenomena in consumer service and increases trading expenses. Within the cities the necessary shift in the allocation of stores from central locations to the outskirts has also not been accomplished everywhere by far. The urban retail trade system has been specialized only in the big cities, and even here specialization is still inadequate. The elimination of the unevenness in the distribution of stores throughout town and country, the establishment in the cities and district centres of a ramified system of specialized retail stores for the sale not only of foodstuffs but also of manufactured goods for general consumption, and the development of a trading network in the new industrial and agricultural centres springing up must be included among the most important tasks facing the trading organizations.

The maximum development of commodity circulation and mobilization of the internal commodity resources requires that all trading systems now existing, co-operative as well as State (the All-Union Co-operative Association, the State Trade System of the People's Commissariat of Supply, the Workers' Supply Departments, the retail trade establishments of various branches of industry, the trading system of the artisan and handicraft co-operative organizations, etc.) must continue to function and de-

velop their operations. At the same time, due to a number of economic and technical trading conditions (alterations in the structure of commodity circulation, specific features of various trading systems, the degree of specialization possible in the particular system, the question of the best adaptation of the particular trading system to certain conditions of work, etc.), the relative importance of the individual trading systems in urban and rural commodity circulation is undergoing a change. The consumers' co-operative system remains the principal trading organization in the countryside; in city merchandising not only the part played by the Workers' Supply Departments but especially that of State trade is gaining in importance.

The tremendous increase in available quantities of manufactured goods and of foodstuffs so that the growth of commodity circulation and the further rise in the level of the material welfare of the toilers of town and country is assured, the pronounced reduction in retail prices, the expansion of the trading system and the improvement in the quality of work of the various trading organizations all have made possible the execution during the Second Five-Year Plan period of the instructions of the Seventeenth Conference of the Communist Party to prepare for the abolition of the rationed issue of commodities and of trading in "closed" stores, *(i.e.,* stores reserved for certain organizations or categories of the population) and have made possible the shift to fully developed Soviet trade. Thereby the role of Soviet trade as a force in the struggle for the successful solution of the principal problems of socialist construction is being enhanced.

The increase in commodity circulation, the rationalization of the work of the trading networks and the solidification of the cost accounting system assure the feasibility of a 26 per cent reduction in the expenses of circulation during the Second Five-Year Plan period. It is contemplated to reduce all items of overhead expense in trading, except packing, preliminary handling and sorting of goods.

VI

The special attention which the Communist Party devoted to the transformation of private housekeeping into large-scale socialized enterprise has made possible the vast expansion of the system of public catering during the last few years. At the beginning of the

First Five-Year Plan period the public catering system lacked both the necessary technical base and cadres. Food was being prepared in establishments handicraft in type where the degree of mechanization of production processes was negligible. The entire system counted only three central kitchens. The public catering system enters the Second Five-Year Plan period as a large-scale, specialized branch of the food industry having more than a hundred central kitchens and an extensive network of large mechanized dining rooms.

At the beginning of 1933 the principal systems of public catering in the cities embraced more than 14,000 enterprises engaged in production, exclusive of dining rooms opened on independent initiative. A great number of scientific research institutions as well as of colleges and technical colleges for the preparation of cadres have been established. The average annual number of urban workers and other toilers served by the dining rooms of the All-Union Co-operative Association and of the People's Commissariat of Supply was 13,100,000 in 1932.

During the course of the Second Five-Year Plan period provision has been made in the cities for extending the principal public catering system to an additional 14,500,000 toilers so as to bring the total number of urban workers and other toilers embraced in the public catering system from 13,100,000 in 1932 to a total of 27,600,000 in 1937. If account is taken of the pre-school children fed by the public catering service within the system of pre-school institutions and those fed in crèches (2,400,000), of the persons catered to at rest homes and sanatoriums (300,000), and of the workers and other toilers served in dining rooms opened on independent initiative (about 2,000,000), the total number of persons embraced by the various public catering systems in the cities will be 32,300,000, or 73.2 per cent of the total urban population (exclusive of breast-fed infants).

The Plan provides for differentiation in the extension of the public catering service to the various groups of the population in order to ensure priority and completeness of service to workers engaged in the leading branches of industry. Almost all industrial, transportation and construction workers (95 to 100 per cent) will receive public catering service, whereas at the beginning of the Second Five-Year Plan period only 65-75 per cent of the total number of workers in the leading branches of industry received such service. Of the employees of Soviet and trading institutions

as well as the educational and public health workers, 75-80 per cent are to be given public catering service. All school children will be fed through the public catering service, and the latter will be considerably extended so as to include members of families of workers and other toilers in the most important industrial districts, primarily of workers engaged in leading trades.

In addition to raising the number of toilers generally served by the public catering system, there is to be an increase in the number of persons receiving all their meals through the public catering service, while the number of dishes served per day is to rise from 2.1 per person in 1932 to 2.5 in 1937. The annual output of the public catering system is increasing in the cities from 8,000,000,000 dishes in 1932 to 20,650,000,000 in 1937, or to 258.1 per cent of 1932.

Public catering is scheduled to develop at still more rapid rates in the countryside. The number of persons receiving public catering service on State farms, in machine and tractor stations, the peat industry and in the fisheries is multiplying almost three times, rising to 6,600,000 in 1937, while the number of dishes served per person is increasing from 2.7 to 3. The annual output of the rural network is being augmented from 1,700,000,000 dishes in 1932 to 4,500,000,000 dishes in 1937, or to 264.7 per cent of 1932.

The Plan does not specify the extent to which public catering is to develop on the collective farms. The various forms of public catering which found extensive application on the collective farms during the years of collectivization are being further developed on a large scale during the Second Five-Year Plan period on the basis of the absolute completion of collectivization in the countryside.[1] The Plan contemplates a 3.6-fold increase in the number of collective farmers to be served in dining rooms organized by the collective farms themselves. This makes it the duty of the All-Union Co-operative Association and the People's Commissariat of Agriculture to render assistance to the collective farms in organizing collective farm dining rooms and instituting there the best system of work (elaborating model projects, training cadres, organizing the supply of equipment, etc.).

[1] According to the figures of the census taken in July 1933 by the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R., about 55,000 common dining rooms have been organized by collective farms.

The total turnover of all systems of public catering in both town and country (exclusive of collective farms) is increasing in 1932 prices from 4,800,000,000 rubles in 1932 to 12,700,000,000 rubles in 1937, a 164.6 per cent increase.

One of the most important tasks of the public catering enterprises during the Second Five-Year Plan period consists in improving the quality of food served. The principal measure designed to effect a decided change for the better in the quality of food served is the shift from the building of central kitchens using the thermos container system to preparatory central kitchens with a network of factory dining rooms.

The preparatory central kitchens will differ from the central kitchens in that they will not serve ready meals but only supply semi-prepared food which will be delivered to the various factory dining rooms (finishing kitchens and dining rooms). In the latter the semi-prepared food will be made ready and served fresh to the consumer. Thus, a considerable improvement in the quality of food will be achieved.

The preparatory central kitchens are a higher type of mechanized public catering establishment than the central kitchens. In the central kitchens each department handles numerous products which must be kept at different temperatures, which require different methods of treatment, etc. At the preparatory central kitchens, on the contrary, each department will handle only one product (meat, fish or vegetables). Every department of a preparatory central kitchen will have its own complete technological process and is to be economically self-sustaining (equipment, fixtures, containers). This will ensure the best conditions under which to work up, keep and haul semi-finished products and to utilize raw materials and waste products to the greatest extent.

The development of the construction of preparatory central kitchens must take into account the plan for the development of the food industry as a whole (meat-packing plants, etc.), which in large centres of population may be able to take over a considerable part of the work of supplying factory dining rooms with semi-finished products.

The existing central kitchens must gradually be reconstructed into preparatory central kitchens.

There must be a decided improvement in the sanitary and hygienic conditions under which food products, semi-finished

products and raw materials are preserved, prepared and transported. Public catering enterprises must be provided with cold storage rooms and ice-cellars.

Within the next few years an extended network of sanitary and hygienic laboratories must be set up for the permanent control of food products on a mass scale, semi-finished products and raw materials in the public catering enterprises. Cadres of physicians acting as food inspectors, also laboratory workers, must be trained for the various public catering systems.

The considerable increase in the number of specialists working in the field of public catering will likewise be instrumental in improving the quality of food. It is planned to raise the number of specialists with college or middle school education, and of specialists having practical experience but no special education—from 16,000 in 1932 to 30,000 in 1937. The number of specialists who have graduated from colleges or middle schools is to exhibit a particularly sharp increase, reaching 4,300 by 1937. In addition to this increase in highly qualified specialists there is to be a considerable rise in the number of workers engaged in mass professions of the food industry who have been trained in factory vocational schools or have completed brigade apprenticeships.

CULTURAL DEVELOPMENT

I

THE following are the chief tasks coming within the purview of cultural development during the Second Five-Year Plan period: a decided advance in the cultural level of the toiling masses as a whole; the creation of extensive new cadres composed of the technically schooled Soviet intelligentsia of working class and peasant origin, which will ensure the supply of the required trained cadres for the whole of national economy and the rapid elimination of the acute shortage of pedagogic and medical cadres; maximum acceleration in the realization of universal literacy and raising the degree of the latter; quickest possible progress in technical education and increased material State support in the development of science; socialist re-education of the broadest masses, especially in the countryside and among the new proletarian cadres; eradication of the bourgeois and petty-bourgeois prejudices among the toilers; vast propagation, among the toilers, of the Marxist-Leninist world outlook; strengthening of conscious, socialist labour discipline; elimination of the national regions' cultural backwardness inherited from the tsarist capitalist-colonial regime.

In conformity with these most important tasks, the basic content of the plan of cultural development during the second five-year period consists essentially not only in the further huge increase in the number of cultural institutions, but also in raising all proletarian culture to a new, loftier plane, in attaining high qualitative indices in every field of cultural endeavour, in making culture an organic part of the struggle for the realization of the plan of socialist construction.

In the sphere of mass education the principal tasks throughout the entire period of the Second Five-Year Plan are as follows: accelerated development of Marxist-Leninist schools of general polytechnic education, completion of the institution of *universal compulsory polytechnic training* within the compass of the seven-year schools (primarily in the rural districts, inasmuch as in the urban districts this problem was already solved during the

course of the First Five-Year Plan period), and the development of the ten-year secondary polytechnic schools; reinforcement and further progress in the literacy and general cultural standards of the toiling masses as a whole; extensive development of pre-school education made possible by the further social and material emancipation of women, and their inclusion in every field of socialist construction; further expansion of the network and the activities of the institutions of mass political and cultural education (clubs, libraries, reading rooms, Houses of Culture, Red Corners, etc.).

A vast amount of work must be carried on to raise the cultural level and improve the political education of the collective farmers as well as of the new workers. The main links in the chain of mass work in the countryside (the political departments of the machine and tractor stations and of the State farms) will be able to ground themselves on the vastly developing network of cultural and educational institutions located on State and collective farms and in the machine and tractor stations.

In the domain of art it is planned to accelerate the rates of development of theatrical enterprises and other forms of art, to encourage artistic activities by the masses themselves and to introduce art extensively into the daily lives of the people. The rates of development are to be accelerated most in the sphere of motion pictures and radio, especially in the countryside.

During the Second Five-Year Plan period the press, in accordance with its further qualitative and quantitative development, is becoming a still more powerful means of mass propaganda, agitation and organization in the struggle for the complete victory of socialism. District organs and other local papers intended for mass circulation are undergoing the greatest development during the Second Five-Year Plan period, especially in the countryside; the same applies to the publication of technical and socio-political literature, textbooks, scientific literature and *belles lettres*. The press is planned to grow to an extent sufficient to supply newspapers and books to the broadest masses of toilers and to satisfy the demand of the educational institutions and libraries.

During the second quinquennial period science and scientific research institutions are faced with particularly important and responsible tasks calling for the solution of new problems, both technical and economic, which have arisen as a result of the First Five-Year Plan period and of the struggle for the accom-

plishment of the principal political, economic and technical tasks of the Second Five-Year Plan period.

The material, technical and financial base of cultural development is expanding on a vast scale during the period of the Second Five-Year Plan. The projected volume of appropriations for current expenditures, construction, equipment, etc., ensures a marked increase in the proportion of the amounts to be spent for cultural purposes during this period.

In finding solutions for the above problems of cultural expansion, the circumstance that first importance has been assigned to the task of effecting a decided improvement in the quality and standard of work of any given institution or organization constitutes a distinguishing feature of the Second Five-Year Plan.

Under the Second Five-Year Plan the expansion of cultural institutions must have the effect of accelerating more than ever the elimination of the difference in cultural and political level between town and country and between the several nationalities of the Soviet Union, while there will be much greater differentiation in cultural expansion when taken according to districts or groups and a concentration of this expansion in the leading and decisive sectors of socialist construction.

The Plan for the second five-year period provides for accelerated rates of cultural expansion for the numerous national districts of the Soviet Union. Accordingly this Plan maps out the highest rates of growth of cultural development for these nationalities and their respective districts, a further decisive penetration of indigenous forces into the schools and the entire system of cultural and educational institutions, the accelerated training of national cadres and considerably more substantial provisions (in comparison with the average for the Soviet Union) to secure the material and financial base of cultural expansion.

II

In 1932 (autumn), 21,700,000 children and adolescents were attending schools of universal education, 3,634,000 of whom were in the senior grades (beginning with the fifth grade).

In 1932, 96-98 per cent, *i.e.*, almost all of the children in the Soviet Union of primary school age (8-11 years), attended school. Besides this, a considerable number of pupils over 12 years of age (2,000,000 so-called over-age pupils) and, on the other hand,

a number of pupils (up to 500,000) under the age of eight likewise attended the lower grades.

The Second Five-Year Plan provides for the further expansion of the junior grades on the basis of ensuring the inclusion of every child between the ages of 8 and 11 and confining the attendance at these schools to pupils within the age limit set (gradual elimination of over-age pupils). Accordingly the total number of pupils who will attend the lower four grades of the schools of general education in 1937 has been set at 18,300,000.

The cardinal task assigned by the Second Five-Year Plan in the field of developing the school system of general education is the realization of universal compulsory polytechnic education within the scope of the seven-year school system. This means that in the middle division alone (the fifth, sixth and seventh grades) there will be an increase to 10,600,000 pupils in 1937, *i.e.*, 3 times as many as in 1932 (3,577,000). The system of compulsory seven-year general education will denote vast cultural expansion in the countryside, for the urban districts had introduced compulsory seven-year education as early as the middle of the First Five-Year Plan period. The adoption of the compulsory seven-year polytechnic school system throughout the Soviet Union is a task requiring that numerous difficulties be overcome, primarily that the schools be provided with trained cadres, suitable premises, equipment, etc. For the Second Five-Year Plan this will be just as "stupendous a victory not only on the cultural but also on the political and economic fronts" (Stalin) as the realization of universal compulsory primary education was for the First Five-Year Plan.

More than 70 per cent of all children between the ages of 12 and 14 (the normal ages for the fifth, sixth and seventh grades) were enrolled in general education schools at the end of the First Five-Year Plan period. The task of fully introducing the system of seven-year general education throughout the entire Soviet Union resolves itself into increasing year by year the number of pupils promoted to the fifth grade until all graduates of primary schools and of the first four grades of middle schools will be included. The Second Five-Year Plan provides for the solution of this problem throughout the entire Soviet Union by the end of the second quinquennial period with only a few insignificant exceptions—cases of postponement for one or two years in the rural places of several districts where the delay is due to organ-

izational difficulties, primarily in the securing of cadres. In the Ukrainian S.S.R., the White Russian S.S.R., and the Transcaucasian S.S.R., as well as in the most important industrial territories and the regions of complete collectivization in the R.S.F.S.R., this task affecting the children and adolescents up to the age of 14-15 is being solved during the first half of the Second Five-Year Plan period. In several areas, for instance in the Central Black Soil Region and in individual districts, this task had already been solved in the main by the end of the first period. In accordance with these time and rate schedules for carrying into life the system of *seven year general education,* 95 per cent of the children between the ages of 8 and 14 will be in schools by the end of the Second Five-Year Plan period. This will include all children between the ages of 8 and 11 and up to 90-92 per cent of those 12-14 years of age.

The republics of Central Asia are registering the greatest relative increase during the Second Five-Year Plan period in the number of pupils at school in the fifth, sixth and seventh grades. In 1937 there is to be a more than 8-fold increase in the number of pupils attending school in the Uzbek S.S.R., as compared with 1932, an almost 6-fold increase in the Turkomen S.S.R. and a 23-fold increase in the Tajik S.S.R., while the increase for the Soviet Union as a whole will be 3-fold. Approximately the same rates of increase have also been projected for the same categories of pupils in a number of national republics of the R.S.F.S.R. Thus, for instance, the number of pupils in the grades indicated is increasing as follows by the end of the Second Five-Year Plan period in comparison with 1932: in Kirghizia—6-fold, in Daghestan—more than 11-fold, in Kazakstan—almost 6-fold, in Yakutia—almost 5-fold, etc. During the same period the number of pupils attending these grades in urban districts is increasing almost 2-fold for the Soviet Union as a whole (from 1,370,000 in 1932 to 2,500,000 in 1937) and 3.6-fold in rural districts (from 2,200,000 to over 8,000,000).

Vast political and national economic importance attaches to the development of the ten-year polytechnic middle school system mapped out by the Second Five-Year Plan.

Eighth, ninth and tenth middle school grades are to be developed first and foremost in the industrial cities and working class districts, in the republic and regional centres and in the districts of the largest State farms and machine and tractor stations. The

total number of pupils attending these grades is rising from 57,000 in 1932, to 1,067,000 in 1937, *i.e.*, a more than 18.7-fold increase.

The number of pupils in the grades indicated in urban districts is rising to 828,000 which means that more than 50 per cent of the entire number of pupils graduating from the seventh grade of incomplete middle schools and of the middle schools, and about 70 per cent of the corresponding numbers in industrial cities and working class districts will be taken into eighth-grade classes by the end of the Second Five-Year Plan period. With reference to these cities and districts, it has been planned to take a decided step forward in the fulfilment of the task set in the program of the Communist Party to provide for the universal polytechnic education of children and adolescents up to 17 years of age.

The high rates of development of the seven-year-course middle schools and the ten-year-course schools of polytechnic education established for the Second Five-Year Plan period will by the end of this period solve in the main the problems of providing institutions for the training of cadres (both higher and middle) with a properly prepared young student body.

The total number of students in the senior grades (fifth to tenth) of the polytechnic schools of general education is rising to 11,635,000 in 1937, *i. e.*, a more than 3-fold increase as against 1932 and a more than 20-fold increase when compared with the pre-war level of tsarist Russia. These immense quotas render the middle school of general education readily accessible for the first time in history to the preponderant majorty of toilers of town and country. They offer to the rising generations of the Soviet Union educational facilities absolutely beyond the reach of the worker and peasant youth in capitalist countries.

The number of persons in primary and middle schools, including all grades, is increasing in 1937 to 30,000,000 for the entire Soviet Union, *i.e.*, to 38 per cent in excess of the 1932 figure. Thus attendance at Soviet schools of general education for children and adolescents will occupy first place in the world.

The rates of development specified for the schools of general education take into account that better trained pedagogic cadres are the main condition for improving the quality of work of these schools.

The pivotal tasks in connection with improving the work of the schools of general education are as follows: to impart a

thorough mastery of the basic principles of science and technology; to enhance the role and significance of the teacher and of discipline; to introduce polytechnic training in the schools on a Marxist-Leninist basis; to improve the curriculums, teaching methods and administrative regulations of the school so as to secure abiding and active assimilation of knowledge, the Communist upbringing of the student body, increased efficiency in the work of the schools (to be accompanied by a pronounced reduction in the number of pupils repeating grades and of those dropping out of school). The Second Five-Year Plan accordingly specifies that by the end of the second quinquennial period the schools of general education shall be provided with pedagogues who shall in the main have received a college or middle-school training in pedagogics (by the enlistment of college and middle technical school graduates and by improving the qualifications of the cadres already at work); that the schools shall be provided with standard textbooks (it being planned to supply each pupil with a complete set of essential textbooks) and with the necessary equipment and school supplies, and that the total available school space and expenditure per pupil be considerably increased.

The total number of pedagogues in the schools of general education is increasing in 1937 to 834,000 as against 628,000 in 1932, inclusive of 339,000 in the senior grades as against 148,000 in 1932. At the same time the Plan provides for 2-3 model schools per district.

Financing of the schools of general education involves a total of 11,800,000,000 rubles for the Second Five-Year Plan period, of which more than 11,000,000,000 rubles are to be appropriated from the budget. This makes it possible to raise the annual expenditure per pupil from 40 rubles 30 kopeks in 1932 to 64 rubles 51 kopeks in 1937, or by 60 per cent in the junior grades, and from 113 rubles 52 kopeks to 173 rubles 63 kopeks, or by 53 per cent in the fifth, sixth and seventh grades.

It has been planned to invest 1,475,000,000 rubles in the construction and repair of schools according to the branch plans of the several People's Commissariats of Education. This sum does not include the amounts to be invested by economic bodies or derived from other sources. This ensures 60,000,000 cubic metres of additional school space (exclusive of dormitories), being a rise from 143,000,000 to 203,000,000 cu. metres or 42 per cent, while the number of students is increasing 38 per cent. It thus becomes

possible to increase the school space per student and to abolish completely the system of continuous instruction, inclusive of free days, and of third sessions in schools.

Besides the capital investments in construction and repairs indicated above, the branch plans of the several People's Commissariats of Education provide for the appropriation of 520,000,000 rubles during the Second Five-Year Plan period for equipment for the schools of general education. Total investments in schools of general education, both those provided for under the plans of the several People's Commissariats of Education and those derived from miscellaneous sources (economic bodies) amount to 2,180,-000,000 rubles for the Second Five-Year Plan period.

III

The transformation, by and large, of the Soviet Union into a country of universal literacy is the historic result of the First Five-Year Plan in the struggle to render the adult population literate. By the end of 1932 the literacy of the population between the ages of 8 and 50 rose to 90 per cent throughout the Soviet Union (as against 58.4 per cent in1927-28 and about 33 per cent in pre-war, tsarist Russia). Among the basic masses of the proletariat literacy has become universal.

It is accordingly the central task of political education during the Second Five-Year Plan period to liquidate semi-literacy among those able-bodied adults who did not have an elementary schooling. This task must be accomplished in the first place with regard to the basic cadres of the proletariat and collective farmers, especially the worker and collective farm youth. Simultaneously, the eradication of the remnants of illiteracy (still considerable among women in the countryside as well as in the republics of Central Asia and in some of the other national districts) to be found among the toilers up to the age of 50 must be completed during the first half of the Second Five-Year Plan period.

The predominant form which the fight for literacy under the Second Five-Year Plan must assume is that of establishing one-year (8 to 9 months) and two-year school courses and a variety of individual and group study courses to be given to adults.

This plan to combat illiteracy is to be supplemented by various forms of secondary school instruction, and of courses and lectures to be given to adults as well as by developing correspon-

dence school courses and self-education. The main objective of these forms of mass training is to secure a higher level of general political and polytechnic education (the equivalent of a middle school or college education) for workers and collective farm activists, especially for the worker and collective farm youth.

The total number of adults attending school courses and other forms of raising the general educational level is planned to be 10,800,000 for 1937 (as against 6,400,000 in 1932).

In the sphere of mass political education the Plan for the second quinquennial period provides for the special development of the system of institutions and nuclei of the club type, especially in the machine and tractor stations and on the State farms.

The network of lower agencies engaged in the work of mass political education in the countryside and the better regulation of the entire system of such activity are to be particularly developed during the Second Five-Year Plan period. Reading rooms—one for each rural Soviet—having a person in charge with budgetary provision for his pay and functioning as the local centre for the work of mass political education; Red Corners connected with these reading rooms and set up in the majority of villages, on the small collective and State farms; clubs on the bigger State farms and on the machine and tractor stations; Houses of Socialist Culture in the district centres serving as model institutions and at the same time as bases for field work; also Collective Farmers' Houses —all these constitute the principal links in the chain of the work of political education in the villages and in the districts in connection with libraries, the radio, motion picture and the local press.

The principal task of these institutions consists in securing stable and fully competent cadres, improving the quality of work on the basis of concentrating on the concrete problems of socialist construction and taking more determined measures to spread mass political education among the lower bodies and units (collective farm brigades, field camps, collective farm households, rural Red Corners).

The total number of trade union clubs and clubs under the People's Commissariat of Education in town and country has been set at 10,870 for the end of the Second Five-Year Plan period (as against 6,800 in 1932).

In the network of clubs it is projected to raise the number of District Houses of Socialist Culture to 2,500 by 1937 (one such House for each district) as against 1,500 in 1932. The total number

of reading rooms is to grow to 66,000 by the end of the Second Five-Year Plan period (as compared with 34,000 in 1932), the number of Red Corners has been set tentatively at 489,000 for 1937 (as against 99,700 in 1932).

Mass libraries are to increase to 25,000 (as against 15,000 in 1932), and are to hold a total of 290,000,000 volumes as against 96,000,000 volumes for the respective years.

The total sum required to finance the operating expenses of the system of mass political education has been fixed at 3,491,000,000 rubles for the Second Five-Year Plan period which includes 1,933,000,000 rubles of budgetary expenses. Capital investments in the system of political education have been calculated to exceed 600,000,000 rubles, of which 219,500,000 rubles are intended for the branch plan of education (inclusive of 159,500,000 rubles for the network of People's Commissariats of Education and 60,000,000 rubles for Trade Union Clubs). The plans of the economic organizations also contemplate extensive development of club construction, for which purpose they are investing 400,000,000 rubles during the second quinquennial period.

IV

Pre-school public education (for children between 3 and 7 years of age) which in tsarist Russia did not exist on a large scale and which was very poorly developed in capitalist countries even during the years preceding the world crisis, has been growing in the Soviet Union by leaps and bounds, exhibiting particularly rapid progress during the period of the First Five-Year Plan as a result of socialist reconstruction and the drawing of female workers and female collective farmers on a gigantic scale into production and into social and political life.

The total number of children in pre-school institutions of all types was 5,200,000 in 1932 as against 308,000 in 1927-28. About 75 per cent of these children attended seasonal institutions (playgrounds, especially in the rural districts). This degree of development of pre-school education was sufficient to include 24 per cent of all children of pre-school age (from 3 to 7) by the end of the First Five-Year Plan period, as against 1.6 per cent in 1927-28. In the cities more than 31 per cent of all such children were included most of whom attended stationary institutions (kindergartens), while in the countryside more than 22 per cent were in-

cluded and these attended primarily seasonal institutions. As a result of the successes of collectivization the rate of increase of children attending pre-school institutions has been highest in the rural districts, especially during the last few years. The Second Five-Year Plan provides for an increase in the number of children attending pre-school institutions to 16,000,000 by 1937, *i. e.*, a more than 3-fold rise when compared with 1932. This signifies that in 1937 an average of over 70 per cent of all children of pre-school age will be attending pre-school institutions in the Soviet Union; of these 15 per cent will be attending stationary schools of pre-school education as against 5.4 per cent in 1932 (an increase in attendance from 1,100,000 to 3,500,000).

In the cities it has been planned to have 80 per cent of the children attend pre-school educational institutions by 1937, 46 per cent of whom are to attend kindergartens. In the countryside about 70 per cent of the children will be included in the pre-school system (as against 22.5 per cent in 1932), 10 per cent of whom will attend stationary institutions (as against 2.3 per cent in 1932). This makes it possible for the bulk of the children of pre-school age in the industrial cities and workers' settlements as well as those on the big State farms, on the machine and tractor stations and on a certain percentage of the large collective farms to attend stationary pre-school institutions by the end of the Second Five-Year Plan period. The Plan also makes provision for the development of the network of model pre-school institutions, tentatively set at 2-3 per district; also for the development of pre-school health institutions (pre-school colonies).

It is essential that the qualifications of the teaching staff and the managers of pre-school institutions be improved, that the time during which these institutitons are open be lengthened to correspond with the time that female workers are engaged in production, and that pre-school institutions be located as near as possible to the homes of the children attending them in order that the quality of work of these institutions may be enhanced.

It is planned to find accommodations for the pre-school institutions in cities and workers' centres by setting aside floor space in houses already built or under construction; likewise by building special pre-school institutions under the several plans of the People's Commissariats of Education and of the economic bodies, this construction to represent a total value of over 300,000,000 rubles. A total of 1,533,000,000 rubles has been appropriated to

finance the operating expenses of the pre-school educational system inclusive of 513,000,000 rubles of budgetary expenditures.

The social insurance system is to bear a considerable portion of the financing of the pre-school institutions serving the urban and rural proletariat.

The sum of 548,000,000 rubles is to be expended by the social insurance system for pre-school education.

The total amount which it is projected to expend during the five years on mass education (social education, political enlightenment) has been fixed at 22,850,000,000 rubles (inclusive of 18,500,000,000 rubles of budgetary expenditures). This amount comprises 19,610,000,000 rubles for expenses of operation and 3,230,000,000 rubles for capital investments including expenditures by economic organizations (not taking into account floor space set aside in dwelling houses and other buildings for cultural and educational institutions, including pre-school, extra-school and other institutions).

Capital investments in pre-school education, including the expenditures provided for under the plan of construction for housing, cultural and social purposes, have been set at more than 600,000,000 rubles.

V

Scientific work is undergoing great development during the Second Five-Year Plan period, especially in connection with the struggle for the mastery of the new technique and the training of highly skilled scientific cadres.

Scientific research work has as its base an extensive network of scientific institutes and their branches which at the beginning of the period of the Second Five-Year Plan embraced all branches of national economy and consisted of 8 academies, 637 institutes and 152 branch institutes of all-Union or Republic importance, 43 central scientific laboratories, 60 all-Union or Republic museums, 10 large scientific libraries, 20 extensive reservation grounds, 9 observatories and in addition quite a number of scientific institutions of local importance.

In this field the chief task during the Second Five-Year Plan period consists in strengthening the existing scientific institutes, improving the quality of their work and rendering it more thorough-going. The Plan provides for the organization during the Second Five-Year Plan period of 13 new scientific institutes and

7 branch institutes of all-Union or Republic importance. In Moscow there will be set up a Coal Institute whose function it will be to study the special features of Moscow coal, a Tool Institute and a Foundry Institute. Various institutes and laboratories of the Academy of Sciences are being developed and reorganized, first and foremost the Physical Institute and the Metallurgical Laboratory. In Podolsk an Institute of Hard Alloys will be organized. The consolidation of the network of scientific institutions in the outlying districts which are being industrialized and in the national republics is receiving special attention. For this purpose there are being organized new branches of the Academy of Sciences in Tashkent and Novosibirsk, a Coal Institute in Novosibirsk, a Transcaucasian Motor Highway Institute in Tiflis, a Ural branch of the All-Union Electrotechnical Institute in Sverdlovsk, a number of new scientific research laboratories and stations of the People's Commissariats of Heavy Industry, Light Industry, Supply, Transportation and Communication respectively.

The basis of the scientific research work in heavy industry will be provided by the numerous main and branch institutes which must maintain much closer organizational contact with the biggest enterprises and with the various factory and mill laboratories. The scientific work in the domain of agriculture will be carried on by numerous institutes of all-Union or Republic importance under the direction of the Lenin Agricultural Academy, a great number of zone experimental stations and of a network of experimental fields and minor observation points organized in machine and tractor stations and on big State farms.

The consolidation and development of the scientific institutes and the establishment of new scientific institutions is attended not only by a growth in scientific cadres, tentatively set at 25 per cent for the end of the Second Five-Year Plan period in comparison with 1933, but also by an improvement in the social composition of the staff of scientific workers by training new scientific cadres of working class and collective farmer origin and by raising the requirements for qualification as scientific worker. It is planned to increase the number of post-graduate students by 40 per cent during the course of the Second Five-Year Plan period (from 6,400 in 1933 to 9,000 in 1937) and qualitatively improve their training.

The decision of the Seventeenth Conference of the Communist Party concerning the increase in the material support to be given

by the State to the development of science in the U.S.S.R. finds expression in the growing funds appropriated for scientific research institutions—an increase from 470,000,000 rubles in 1932 to 970,000,000 rubles in 1937.

To consolidate the material base of the scientific institutions, the Plan provides that capital investments are to increase from 390,000,000 rubles—the amount invested under the First Five-Year Plan—to 1,003,000,000 rubles (for construction, repairs and scientific laboratory equipment) during the Second Five-Year Plan period. The list of major items of construction specified in the Plan includes: the construction of the All-Union Institute of Experimental Medicine and its branches, of the Chemical and Geochemical Institute, the Power Institute as well as a number of other institutions of the Academy of Sciences; the construction of a building for the Communist Academy, the erection of the Lenin Library, of the Central Archive, the Museum of the Revolution, the White Russian Academy of Sciences, the Academy of Municipal Services and numerous other institutes.

The activity of the scientific research institutions is being directed toward the theoretical elaboration of the principal problems of socialist construction and technical reconstruction, toward the mastery of the latest achievements of world science and technique, the transference of this knowledge to the national economy of the Soviet Union and the ensuring of its complete technical and economic independence of the capitalist world. In addition to scientific research subjects of direct practical application to national economy, the plans of work of the institutes make provision for important theoretical and experimental work of general or prospective importance.

The subjects in the field of social and economic sciences which are taken up by the various institutes of the Communist Academy, by the Marx-Engels-Lenin Institute, the Social Science Department of the Academy of Sciences and other socio-economic institutes embrace the principal problems arising in connection with the building of classless society and the tasks of national economic planning.

The work of the institutes of the People's Commissariat of Heavy Industry, which is intimately connected with the technical progress prescribed for the second quinquennial period by the technical reconstruction plan, is being directed towards the enhancement of the leading role of the Soviet machinery industry and the

creation of a modern power base. In the domain of machinery production, scientific work is being focused principally on the problems of specializing the various machinery plants, of standardizing the types of machines, improving the designs of machine-tools and other machinery, revising the technological processes of machinery manufacture (Central Scientific Research Institute of Machinery Production and Metal Treatment), the introduction of the use of Diesel engines for automobiles and tractors (Scientific Institute of Automobile and Tractor Construction and the Scientific Institute of Diesel Motor Construction). The principal scientific subject in the line of agricultural machinery manufacturing is to be the completion of the mechanization of agriculture, the motorization of farming implements, the creation of new machines for cultivation and harvesting of industrial crops, etc. (All-Union Scientific Research Institute of Agricultural Machinery Construction).

In the field of power engineering the main problems are the standardization of electric power stations and the introduction of automatic machinery in these stations, the shift to a unified high voltage network, the design of converters and powerful transformers (Leningrad Institute of Electro-Physics, All-Union Electrotechnical Institute, and others), the design of powerful turbines and generators (All-Union Institute of Heat Engineering). In the field of metallurgy, the Leningrad Metallurgical Institute and other metal institutes are occupying themselves with problems concerning the rationalization of metallurgical processes, the ensuring of a high-grade fuel supply for these processes, the study of the questions of the direct production of iron and the manufacture of new kinds of special steel.

The Lenin Agricultural Academy as represented by its principal institutes (All-Union Botanical Institute, All-Union Institute of Animal Breeding, the Institute for the Mechanization of Agriculture and others), is devoting itself to the elaboration of scientific measures for raising crop yield, for the application of crop rotation by zones and types of farms, the problems concerning the mechanization of agriculture, the use of the most modern fertilizers, the breeding of new varieties of agricultural plants; in the field of stock-raising—the problems of increasing the herd of cattle and improving them qualitatively, of consolidating the collective farms organizationally and economically, etc.

The institutes of the People's Commissariats of Transportation and of Communication are likewise developing extensive scientific

work along the line of radically reconstructing transportation and communication facilities, while the institutes of the People's Commissariat of Light Industry are working on improving the quality of output of light industry, and the institutes of the People's Commissariats of Supply are occupied with such problems as the securing and extending of the food supply base.

VI

In 1937 the press will receive 402,500 tons of newsprint and other printing paper as against 211,500 tons in 1932. Newsprint resources are increasing to 261,000 tons (or to 184.5 per cent of the 1932 output), while the quantity of paper to be supplied for the purpose of publishing books and magazines (inclusive of calendars) is increasing to 141,500 tons (or to 202.1 per cent of 1932).

The increasing resources of newsprint are being utilized mainly to raise the circulation of newspapers so as to reach the greatest number of readers. Part of this increase is to be applied to increasing the number of newspapers, primarily that of newspapers of political departments, and to increasing the number of issues of periodical publications appearing at longer intervals, particularly the district press, local publications and newspapers of national districts, machine and tractor stations and State farms.

It is planned to raise the aggregate circulation of newspapers per issue to 66,000,000 copies in 1937 as against 35,500,000 copies in 1932 (*i.e.*, to 186 per cent of 1932) while the annual circulation is to increase to 10,500,000,000 copies as against 5,700,000,000 (or to 184.2 per cent of the former figure). The republics of Central Asia, Transcaucasia and White Russia are to exhibit the greatest increases.

It is contemplated to augment the output of books and magazines to 6,875,000,000 printed sheets in 1937 as against 3,263,300,000 printed sheets in 1932. The greatest increase in printed sheets has been specified for the republics of Central Asia where the respective quantities are multiplying 5-fold.

Of the various branches of literature, textbooks, industrial, technical and agricultural works, as well as *belles lettres* are undergoing the relatively greatest growth, as appears from the following data:

Publication of Books and Magazines During the Second Five-Year Plan Period, by Principal Branches of Literature

Branches of literature	1932		1937		1937 in % of 1932
	In million printed sheets	Percentage of total	In million printed sheets	Percentage of total	
All literature (books and magazines)	3,263.3	100.0	6,875.0	100.0	210.6
of which:					
Textbooks (for elementary and middle schools, for schools and courses for adults as well as for the training of cadres and for political education)	885.5	27.1	2,100.0	30.5	237.2
Other branches of literature:					
Social science and political	1,245.2	38.2	2,175.0	31.6	174.7
Industrial and technical	493.1	15.1	1,100.0	16.0	223.3
Agricultural, including agronomic	293.4	9.0	655.0	9.5	223.2
Belles lettres	230.3	7.1	510.0	7.4	221.4

It has been planned to provide all students attending schools or courses with complete sets of the principal textbooks by the end of the Second Five-Year Plan period.

The greatest absolute increase has been mapped out for social science and political literature which will retain first place in absolute and relative volume of output during the Second Five-Year Plan period.

Capital investments in the press have been allocated in conformity with the task of providing the necessary high-grade printing facilities required by the publishing industry. In order that publications may be rapidly distributed, especially in the countryside, it has been planned to widen and reconstruct trading and storing facilities to a considerable extent.

The following are some of the largest and most important building projects for the Second Five-Year Plan period: the completion of the construction of the huge *Pravda* Combination in Moscow (printing plant and publishing house); reconstruction and installation of additional equipment at the *Izvestia* printing plant and the construction of the "House of Books" of the State Publishing Association; the reconstruction and extension of the printing and publishing base of the Party Publishing House in the centres and the provinces; the printing plant of the newspaper *Kom-*

munist; a book and magazine printing plant in the Ukraine; the "House of Books" of the Georgian State Publishing Association in Tiflis, the printing plant of the *Pravda Vostoka* in Uzbekistan, and a number of printing plants in Turkmenistan and Tajikistan.

The plan governing publishing house printing plants provides for the erection of two huge book-publishing combinations having an output capacity of 1,200,000,000 printed sheets each. The concentration of the printing and shipping of publications appearing in large editions in the vicinity of powerful paper plants, which will greatly economize transportation and funds as well as paper and will effect a great reduction in the cost of publication, represents the special feature of this type of book-publishing combination.

The first of these book-publishing combinations has been projected for the publishing houses in the system of the State Publishing House Association of the R.S.F.S.R. to be attached to the Kama Paper Combination where textbooks for elementary and middle schools as well as large editions of agricultural and Young Communist League books will be published.

The more important building projects in the centres of the national republics and regions of the R.S.F.S.R. include the construction of huge publishing house printing plants (to cost 1,000,000 rubles and over) in the Tatar Republic, Chuvashia, the Mari and Udmurt Regions, in the Komi Region and elsewhere.

It is contemplated that the construction of new printing plants to serve the local and district press throughout the Soviet Union will absorb 15,500,000 rubles, exclusive of capital investments in printing shops for political departments at the expense of the corresponding economic organs.

The total amount to be invested in the press during the Second Five-Year Plan period (exclusive of expenditures to be made by economic organs and under miscellaneous plans) has been set at 116,500,000 rubles (as against 48,500,000 rubles during the First Five-Year Plan period). Of this appropriation, 78,300,000 rubles have been allocated for construction and repairs, while 38,200,000 rubles are to be used for equipment. The Plan provides for the appropriation of 16,900,000 rubles to cover expenditures for trading premises and warehousing space.

The greatest increase in capital investments has been projected for the national language, the local and the district press where the amounts total respectively 3 and 5 times the appropriations under the First Five-Year Plan.

VII

The following are the most important features of the plan for the development of art during the second quinquennial period: a higher plane on which every form of art is to be presented to the masses as compared with the First Five-Year Plan period, a more extensive development of the network of places of entertainment in the national republics and regions, a considerable growth of new creative cadres and increased penetration of the countryside by every form of art, all of which is to be accomplished on the basis of a radical improvement in the quality of artistic endeavour.

The total number of places of public entertainment, including theatres, motion picture houses, circuses and exhibitions, is increasing from 26,950 in 1932 to 71,500 by the end of 1937.

In the field of theatrical art it is planned to build theatres which are to be allocated to the various national and industrial centres including Kharkov, Tashkent, Minsk, Sverdlovsk, Rostov-on-Don, Alma Ata, Magnitogorsk, Chelyabinsk, Verkhne-Udinsk, Khabarovsk, Stalinabad, Erivan, Ashkhabad, Stalino, Tiflis, etc. The network of theatrical troupes is also to be developed, their number increasing from 560 units in 1932 to 1,080 in 1937. The number of travelling theatrical enterprises is growing to 528 as against 174 in 1932; of these, 324 will tour the countryside (in comparison with 112 enterprises in 1932). This expansion of the network of places of entertainment is accompanied by a more than 2-fold increase in seating capacity.

The total capital investment in construction in this domain amounts to 173,000,000 rubles (without taking into account investments by economic agencies).

The material base of the fine arts—painting, sculpture—is undergoing considerable development during the Second Five-Year Plan period as the result of the building of a factory having departments for the manufacture of art supplies and the execution of technical art work; also as a result of the erection of exhibition halls and art studios for masters of the fine arts in Moscow, the Ukraine and the Transcaucasian Republic.

In the cinematographic art there is to be a growth of the motion picture network from 26,163 units in 1932 to 70,000 units in 1937 exclusive of Red Army and school motion picture installations. The construction of motion picture theatres is assuming vast dimensions in both town and country, especially the latter. It has been planned to invest the sum of 465,000,000 rubles in

the construction and equipment of motion picture places during the course of the Second Five-Year Plan period.

The quality of performance of the motion picture shows is improving greatly as a result of the increase in sound picture installations, the replacement of obsolete apparatus by new, the increase in the number of films available, etc.

The starting of operations in the new photographic film factory and the building of motion picture film factories in the national republics considerably broaden the technical base of the motion picture and photography industry. The total amount to be invested in the motion picture industry during the Second Five-Year Plan period is 210,000,000 rubles, as against 44,000,000 rubles during the first period.

* * *

Culture building, a constituent part of the general task of the building of socialism in the U.S.S.R., is making rapid headway during the Second Five-Year Plan period, thus ensuring the accomplishment of the historic tasks of transforming the Soviet Union into a country of foremost culture, the tasks of increasing the degree of literacy among the people and of accelerating the development of education and science, of the press and the arts.

Cultural expansion during the Second Five-Year Plan period must conduce to still greater progress in the sphere of socialist culture which is bringing up the masses of all peoples of the Soviet Union in the spirit of internationalism and the consolidation of the dictatorship of the proletariat.

FINANCE

THE program of capital investment, production, cultural and welfare measures and improvement in living conditions as well as of appropriations for administration and defence in the period of the Second Five-Year Plan will require for its fulfilment an expenditure of 341,500,000,000 rubles, or 2.8 times the expenditure incurred in the First Five-Year Plan period.

The realization of this vast financial program is being provided for by the planned increase in output of every branch of socialist economy, a decided qualitative improvement in the work of the latter and a great increase in socialist accumulation on this basis.

According to the Second Five-Year Plan, the accumulation in national economy will amount to 273,000,000,000 rubles, after making allowance for reduction of prices.

Given a 2.1-fold increase in industrial output in 1937 (in 1926-27 prices) as compared with 1932 and a 2-fold increase in freight carried by all systems of transportation, the great increase in labour productivity, the reduction of production costs of industrial output and of transportation, and the lowering of the costs of circulation ensure a 3.8-fold increase in the profits of Soviet enterprises as a whole (not counting the turnover tax).

The increase in the profits of national economy, to an extent exceeding the growth of production and of shipments, is an expression of the considerably increased profitableness of all branches of industry.

Of the general total of accumulation (together with turnover tax) calculated for 1937 in the amount of 93,700,000,000 rubles, 28,600,000,000 rubles will be applied to lowering the level of retail prices in socialized trade.

The mobilized means of the population (derived in the form of voluntary as well as obligatory payments) are planned to increase by 10.0 per cent as compared with 1932 (from 8,200,000,000 rubles to 9,000,000,000 rubles). In this connection it should be mentioned that the actual payments to be received from the population by the State will be less than the sum planned to be mobilized in the Second Five-Year Plan period, owing to the fact that

the counter-payments to the population in connection with the retirement of loans and the payment of loan interest and prizes will increase almost 3-fold.

The volume and composition of the financial revenues (according to the Unified Financial Plan) will be seen from the following table:

Sources of revenue	1932		1937		First five-year period		Second five-year period	
	Billion rubles	Percentage of total	Billion rubles	Percentage of total	Billion rubles	Percentage of total	Billion rubles	Percentage of total
I. a) Accumulation of socialized economy (not allowing for lowered prices)	33.8	75.8	93.7	83.1	83.6	69.6	328.0	79.9
of which:								
1. Profits	6.6	14.8	24.7	22.0	19.1	15.9	72.9	17.8
2. Turnover tax	19.6	43.5	59.4	52.7	42.3	35.2	216.1	52.6
b) Accumulation of socialized economy, allowing for lowered prices	33.8	75.8	65.1	77.4	83.6	69.6	273.0	76.8
II. Depreciation of fixed capital	2.0	4.5	5.9	7.0	6.3	5.3	20.2	5.7
III. Mobilized means of the population	8.2	18.4	9.0	10.7	21.5	17.9	44.6	12.5
IV. Other revenues	0.6	1.3	4.1	4.9	8.7	7.2	17.7	5.0
Total revenue, allowing for lowered prices	44.6	100.0	84.1	100.0	120.1	100.0	355.5	100.0
Total revenue, not allowing for lowered prices	44.6	100.0	112.7	—	120.1	100.0	410.5	—

The increase in the proportion which the accumulation in socialized economy forms of the total revenues, from 69.6 per cent in the First Five-Year Plan period to 76.8 per cent during the second period (and, if no allowance is made for lowered prices, to almost 80 per cent) is determined by the vast growth of intra-plant accumulation in industry itself assured by the projected reduction in costs of production and circulation.

A characteristic feature of the financial program of the Second

Five-Year Plan is the increase in the proportion of expenditure for cultural and social welfare measures (*e.g.*, for education, public health, training of cadres, science and the press), while full provision is made for the financing of national economy, administration and national defence. While the total of all expenditures will increase 1.7 times as compared with 1932, expenditures on cultural and social welfare measures are increasing more than 2-fold, the proportion of these expenditures at the same time rising from 21.2 per cent in 1932 to 26.1 per cent in 1937. The sum of 75,400,000,000 rubles planned for financing cultural and social welfare institutions during the Second Five-Year Plan period will provide for a considerable extension of the number of these institutions and improvement in the quality of the services they render the toilers. In particular, the financial plan provides for an increase in the number of students in elementary and middle schools by 37.8 per cent and in colleges and middle technical schools—by 42.1 per cent; the number of hospital beds is being increased by 61.1 per cent, of medical stations—by 49.2 per cent, and so forth. The increase in the cost of administration as compared with the First Five-Year Plan period is in the main due to the considerable increase effected in 1933 in the salaries of the lower Soviet officials, and to the fact that village Soviets have been provided with competent accounting personnel.

The sum of 221,400,000,000 rubles planned for the financing of national economy in the Second Five-Year Plan period will fully provide for capital investments and for the accumulation of stocks in the spheres of production and circulation to the extent necessary to guarantee the normal functioning of producing and trading enterprises. An increase of the capital of circulation in national economy to the amount of 28,200,000,000 rubles is contemplated for the Second Five-Year Plan period; this amount takes into account the task of improving the quality of output and of the stocks of goods necessitated by greater assortments.

The main categories of expenditure (according to the Unified Financial Plan) are shown in the following table: (See table p. 540.)

These expenditures will be fully covered by the financial resources which will be at the disposal of the Unified Financial Plan —the budget, the branch plans of national economy and the credit institutions, with the 35 per cent price reduction fulfilled as planned.

Expenditures	1932		1937		First five-year period		Second five-year period	
	Billion rubles	Percentage of total	Billion rubles	Percentage of total	Billion rubles	Percentage of total	Billion rubles	Percentage of total
Financing of national economy	30.2	67.8	46.8	60.3	80.3	66.8	221.4	64.8
Financing of cultural and social-welfare measures (exclusive of expenditures of economic organizations on training cadres) . . .	9.5	21.2	20.2	26.1	23.9	20.0	75.4	22.1
Administration and defence	2.5	5.6	4.3	5.5	9.0	7.5	19.0	5.6
State loan service	1.0	2.3	2.8	3.6	2.2	1.9	10.0	2.9
Miscellaneous expenditures	1.4	3.1	3.5	4.5	4.7	3.8	15.7	4.6
Total expenditure . . .	44.6	100.0	77.6	100.0	120.1	100.0	341.5	100.0

The budgetary system during the Second Five-Year Plan period will continue to be a most important instrument for the centralized accumulation and distribution of the resources assigned for financing the economy, culture, administration and defence of the country, and for the creation of the necessary reserves.

It suffices to point out that of the total financial resources of the Second Five-Year Plan period constituting 355,500,000,000 rubles after allowing for reduction of prices, the revenues of the budget system (the unified central budget and the local budgets) will amount to 259,900,000,000 rubles, or 73.1 per cent. The proportion of the resources derived directly from socialist economy is increasing from 80.3 per cent in 1932 to 82.7 per cent in 1937, while the proportion of revenue obtained from the population is decreasing from 16.8 per cent to 12.7 per cent. The qualitative changes provided for by the Second Five-Year Plan will be reflected both in the composition of the financial resources and in the budget.

The greatest structural changes are being mapped out in the expenditure side of the budget. The proportion of expenditure devoted to financing national economy is decreasing from 68.8 per cent in 1932 to 58.9 per cent in 1937, while at the same time the proportion of expenditure for cultural and social purposes is increasing from 12.7 per cent to 22.0 per cent, and for loan serv-

ice—from 2.7 per cent to 5.4 per cent. The proportionate decrease in the sums assigned for financing national economy is determined in the main by the planned increase of accumulation in national economy itself (profits and depreciation fund) which is to cover the greater part of all expenditures.

After meeting all expenditures, the general budget of 1937 provides for a free reserve of 6,200,000,000 rubles out of a total reserve of 6,500,000,000 rubles in the financial plan. The free reserve goes to meet the cost of any additional measures that may be passed in the course of fulfilment of the Second Five-Year Plan. The interrelation between the most important branches of national economy and the budget during the Second Five-Year Plan period, both as regards their respective contributions to the budget and the financing they receive from the budget, will be seen from the following table (in billion rubles):

Branches of national economy	Payments into the budget from turnover tax and levy on profits	Financial aid received from the budget (State and local)	Balance (+ if in favour of the budget, — if in favour of national economy)
1. Industries of the four industrial People's Commissariats . . .	108.5	53.8	+ 54.7
2. Agriculture (P. C. of Agriculture and P. C. of State Farms) . .	0.1	19.6	— 19.5
3. Railway transportation	17.4	17.4	—
4. Other forms of transportation .	0.1	9.7	— 9.6
5. Communication	2.0	1.4	+ 0.6
6. Municipal services	4.7	5.1	— 0.4
Total	132.8	107.0	+ 25.8

The main task of the credit system during the Second Five-Year Plan period consists in strengthening the control by the ruble in industry, construction and commodity circulation. Much was already achieved during the first year of the Second Five-Year Plan period in stressing control by the ruble, but not enough. In particular, one of the most important achievements was the strict control established over the wage fund. Considerable attention must be devoted to perfecting the system of settling accounts between various economic units, and between the latter and credit institutions, in order to eliminate finally the mutual extension of credit by economic organizations.

As regards the loan operations of the State Bank, provision has been made for the further increase of normal financing due to the growth of production, commodity circulation and commodity procurements by State agencies, while financing not provided for in the Plan is to be reduced to a minimum and the prolongation of due loans is to be entirely discontinued. All credit operations of the State Bank in connection with the financing of national economy are to be covered entirely by the normal growth of the bank's resources (general and earmarked current accounts) and of the bank's own accumulations. While the credit operations of the State Bank are increasing considerably during the Second Five-Year Plan period, interest rates both on deposits and on loans are to be reduced. The fulfilment of the plan of socialist accumulation, the reduction of prices in collective farm, State and co-operative trade, the extension of the system of settling accounts without the medium of cash payments and the considerably increased operations of the savings banks in mobilizing the cash savings of the population must ensure the fulfilment of the Second Five-Year Plan without the need to resort to currency issues.

The growth in the material resources of national economy and the increase in commodity circulation on the basis of widely developed Soviet trade will, in conjunction with a reduction of prices, contribute still further to the stability of the currency system and enhance the function of money as an instrument for the furtherance of the national economic plan.

The fulfilment of the Second Five-Year Plan in respect to accumulation in socialist economy and the rational employment of the vast appropriations demand the rigid application of cost accounting and control by the ruble, and the strengthening of financial and credit discipline in every branch of national economy throughout the U.S.S.R.

TABLES

I. SUMMARY TABLE OF PRINCIPAL INDICES OF PLAN OF NATIONAL ECONOMY

Indices	Units of measurement	1932	1937	1937 in % of 1932
I. Population				
1. Total number at end of year .	millions	165.7	180.7	109.1
of which:				
a) Urban	„	39.7	46.1	116.1
b) Rural	„	126.0	134.6	106.8
2. Total number of workers and employees	„	22.9	28.9	126.0
of which:				
Agricultural workers	„	2.9	3.6	125.1
II. National Income				
1. Total (in 1926-27 prices) . . .	bill. rbls.	45.5	100.2	220.2
of which:				
a) Industry	„	20.6	46.4	225.2
b) Agriculture	„	8.4	17.6	210.0
c) Construction	„	6.2	14.3	230.0
d) Transportation (rail, water, motor and horse-drawn) . .	„	2.5	4.8	190.0
2. Accumulation and consumption in national economy (in 1932 prices):				
a) Accumulation	%	100.0	180.3	—
b) Consumption	„	100.0	242.1	—
c) Reserves	„	100.0	160.9	—
3. Percentage of national income represented by accumulation and consumption:				
a) Accumulation	„	24.2	19.4	—
b) Consumption	„	73.1	78.7	—
III. Fixed Capital (Yearly average in operation, in 1933 prices)	—			
Total in all branches of national economy[1]	bill. rbls.	85.2	195.2	229.0
of which:				
a) Industry	„	25.5	75.2[2]	294.0

[1] Fixed capital for the First and Second Five-Year Plan periods is given in the fixed prices of 1933, imported equipment being converted into and calculated in domestic prices. The figures for industry, agriculture, transportation and communication refer only to capital invested for production purposes.

[2] Taken together with the sums allocated to the various enterprises for education and health protection the fixed capital of industry amounts to 77,000,000,000 rubles.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
of which:				
Group "A"	bill. rbls.	18.4	58.2	316.2
Group "B"	„	7.1	17.0	237.9
b) Agriculture	„	11.4	22.6	198.5
of which:				
State farms	„	2.7	6.3	233.3
Machine and tractor stations	„	0.8	5.0	602.4
c) Transportation	„	19.8	38.5	194.0
of which:				
Railway	„	14.2	26.2	183.8
Waterway	„	2.4	4.9	204.5
d) Urban housing and housing reserved for factory workers	„	12.4	23.3	187.4
e) Municipal services	„	4.7	10.3	217.5
f) Education	„	3.8	9.0	234.9
g) Public health	„	2.0	4.6	226.2
IV. Construction				
1. Total for the whole of national economy [1]	mill. rbls.	50,502	133,400	264.1
of which:				
a) Industry	„	24,789	69,545	280.5
of which:				
Group "A"	„	21,292	53,442	251.0
Group "B"	„	3,497	16,103	460.5
b) Agriculture	„	9,687	15,239	157.3
of which:				
State farms	„	4,475	5,475	122.3
Machine and tractor stations	„	1,173	6,360	542.2
c) Transportation	„	8,933	26,342	294.9
of which:				
Railway	„	6,398	17,364	271.4
Waterway	„	1,189	4,316	363.0
2. Construction for social and cultural purposes:				
a) Urban housing and housing reserved for factory workers [2]	„	4,000	12,502	309.4

[1] Exclusive of the investments in agriculture made by the collective farms and collective farmers out of their own resources or in the form of labour and exclusive of the value of the labour performed by the population in building roads for vehicular traffic. The value of construction and of enterprises put in operation during the period of the First Five-Year Plan is given in the prices of the corresponding years. The figures for the Second Five-Year Plan are given in 1933 prices. In the column for 1932 the figures relate to the 4 1/4 years of the First Five-Year Plan period, while those in the column for 1937 cover the five years of the Second Five-Year Plan period.

[2] In addition to which housing construction in the socialized sector of agriculture to the value of 910,000,000 rubles, and hotel construction — 185,000,000 rubles.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
b) Construction for municipal services [1]	mill. rbls.	1,850	7,145	386.2
c) Education [1]	"	1,150	3,979	346.0
d) Public health [1]	"	730	3,498	479.2
3. Enterprises, etc., opened for operation (total)	"	38,586	132,030	342.2
of which:				
a) Industry (including housing reserved for factory workers)	"	15,728	69,050	439.1
b) Agriculture	"	9,234	15,379	166.5
c) Transportation	"	7,723	25,643	332.0
of which:				
Railway	"	5,550	17,220	310.3
4. Total construction in national economy (in prices of the years indicated)	"	50,502	120,083	237.7
V. Output of Industry				
1. Gross output of all industry in 1926-27 prices	"	43,300	92,712	214.1
of which:				
Group "A"	"	23,100	45,528	197.2
Group "B"	"	20,200	47,184	233.6
Share of group "A"	%	53.3	49.1	—
Share of group "B"	"	46.7	50.9	—
Large-scale industry	mill. rbls.	38,500	86,430	224.5
Large-scale industry exclusive of timber cutting and fisheries (census industry [2])	"	36,801	83,580	227.1
P. C. of Heavy Industry	"	14,279	33,500	234.6
P. C. of Timber	"	1,800	3,600	200.0
P. C. of Light Industry	"	7,832	19,500	249.0
P. C. of Supply	"	4,635	11,870	256.1
Produce Procurement Committee of the Council of People's Commissars	"	1,025	2,500	244.0
Chief Board of the Motion Picture and Photography Industry	"	58	300	516.3
Gross industrial output of handicraft co-operative organizations (1932 prices)	"	5,696	11,590	203.5

[1] Inclusive of allocations for municipal services, education and public health provided for in the plans of industry and other branches of national economy.

[2] Census industry comprises industrial enterprises employing not less than 16 workers where there is mechanical driving power, and not less than 30 workers where there is no mechanical driving power.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
2. Average annual rate of increase during the period of the Five-Year Plan:				
Output of all industry	%	—	—	16.5
Group "A"	"	—	—	14.5
Group "B"	"	—	—	18.5
Large-scale industry	"	—	—	17.5
Census industry	"	—	—	17.8
P. C. of Heavy Industry	"	—	—	18.6
P. C. of Timber	"	—	—	14.9
P. C. of Light Industry	"	—	—	20.0
P. C. of Supply	"	—	—	20.7
3. Main items of industrial production (physical output):				
Electric power generated by all electric power stations	mill. kwh.	13,390	38,000	283.8
of which:				
By the regional stations under Chief Power Board	"	8,268	24,500	296.3
Coal	mill. tons	64.33	152.5	237.1
Crude oil and gas	"	22.27	46.8	210.1
Pig iron	"	6.16	16.0	259.9
Steel	"	5.92	17.0	289.0
Rolled products	"	4.29	13.0	303.1
Railroad rails, first grade	thous. tons.	332.0	1,300.0	391.6
Copper	"	46.6	135.0	289.7
Zinc	"	14.8	90.0	608.0
Aluminium	"	0.9	80.0	—
Total output of metal-working industry (inclusive of repairs, in 1926-27 prices)	mill. rbls.	9,410	19,500	207.2
of which:				
P. C. of Heavy Industry	"	7,252	15,750	217.2
Tractors (in 15 h. p. equivalents)	thousands	51.6	166.7	323.0
Metal-working machine-tools	"	15.0	40.0	266.7
Harvester-combines	"	10.0	20.0	200.0
Motor vehicles	"	23.9	200.0	837.0
Locomotives, freight and passenger, in standard "E" and "SU" equivalents	units	828	2,800	338.0
Trunk-line electric locomotives	"	1	150	—
Freight cars (in 2-axle equivalents)	thousands	22.3	118.4	530.9
Passenger cars	units	1,133	3,500	308.9
Cement	thous. tons	3,481	7,500	215.6
Fire-clay	"	793	2,300	290.0
Dinas-clay	"	178	718	403.4
Window glass (total)	thous. m^2	22,300	81,400	365.0
Sulphuric acid	thous. tons	495	2,080	420.2

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
Soda ash	thous. tons	284	700	246.5
Caustic soda	"	80.8	354.0	438.0
Automobile tyres (Standard and "Giant")	thousands	552.5	3,000.0	543.0
Merchant timber hauled	mill. m³	99.4	170.0	171.0
Saw-mill products	"	24.4	43.0	176.2
Paper	thous. tons	471.2	1,000.0	212.2
Cotton fabrics	million m	2,719.7	5,100.0	187.5
Woollen fabrics	"	91.3	220.0	240.9
Linen fabrics	mill. m²	130.0	600.0	461.5
Soap (40% fatty matter)	thous. tons	357.2	1,000.0	280.0
Leather footwear	mill. prs.	82.0	180.0	219.5
Flour and cereals (total)	thous. tons	38,757.0	55,350.0	142.8
Fish (catch)	"	1,333.0	1,800.0	135.0
Meat (P. C. of Supply)	"	435.0	1,200.0	275.9
Granulated sugar	"	828.2	2,500.0	302.0
Canned goods (P. C. of Supply)	mill. cans	716.0	2,000.0	279.3
VI. Agriculture				
1. Total sowing area	million ha.	134.4	139.7	103.9
of which:				
Under grain	"	99.7	104.8	105.1
Sowing area:				
a) State farms	"	13.4	16.8	125.4
b) Collective farms	"	91.5	120.3	131.7
c) Individual farms	"	27.6	—	—
2. Tractor fleet in agriculture (at end of year)	thous. h. p.	2,225.0	8,200.0	368.5
3. Motor vehicles (at end of year)	thousands	14.0	170.0	—
4. Agricultural machinery and equipment supplied	mill. rbls.	405.0	625.0	154.3
5. Mineral fertilizers supplied:				
Nitrates	thous. tons	22.2	1,410.0	—
Potash	"	79.0	1,680.0	—
Superphosphate (14%)	"	614.0	3,000.0	488.6
Phosphorite (powdered)	"	396.0	2,200.0	555.5
6. Number of machine and tractor stations (at end of year)	units	2,446.0	6,000.0	245.3
7. Peasant holdings collectivized	%	61.5	absolute completion of collectivization	
8. Gross output (1926-27 prices)	mill. rbls.	13,071.8	26,160.0	200.1
of which:				
a) Land cultivation	"	9,779.2	18,133.0	185.4
b) Stock-raising [1]	"	3,184.8	7,102.6	223.0

[1] Not counting the value of the natural increase.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
9. Production (physical output):	mill.			
a) Grains	centners	698.7	1,048.0	150.0
b) Unginned cotton	„	12.7	21.25	167.3
c) Long-fibre flax	„	5.0	8.0	160.5
d) Sugar beet	„	65.6	276.0	420.7
10. Yield [1]	centners			
a) Grains (total)	per ha.	7.5	10.0	133.3
b) Cotton (irrigated)	„	7.5	12.0	160.0
c) Long-fibre flax (fibre)	„	2.26	3.7	163.7
d) Sunflower seed	„	5.5	8.5	154.6
e) Sugar beet	„	120.1	200.0	166.6
11. Productive livestock (as of spring of year indicated):				
Horses	millions	19.6	21.8	111.2
Cattle	„	40.7	65.5	160.9
of which:				
Cows	„	21.0	26.9	128.1
Hogs	„	11.6	43.4	374.1
Sheep and goats	„	52.1	96.0	184.3
VII. Transportation [2]				
1. Length of railroad lines	thous. km.	83.3	94.0	112.8
of which:				
Electrified lines (in normal operation)	km.	50.0	5,050.0	—
2. Length of navigated waterways	thous. km.	84.0	101.0	120.2
3. Length of well-paved metalled highways	„	40.0	66.0	165.0
4. Total number of locomotives (actual units)	thousands	19.5	24.6	126.2
Freight locomotives (in "E" equivalents)	„	12.1	18.4	152.0
Passenger locomotives (in "SU" equivalents)	„	2.8	4.6	164.2
5. Freight cars (in 2-axle equivalents)	„	552.0 [3]	800.0	144.9
6. Total load capacity of freight cars	mill. tons	9.5 [3]	15.8	166.3
7. Motor vehicles	thousands	75.4	580.0	769.2
8. Freight traffic:				
a) Railroad transportation	mill. tons	267.9	475.0	177.3
b) River transportation by tugs	„	46.9	90.0	191.9
c) Maritime transportation (in Soviet bottoms)	„	14.8	40.0	269.9
d) Airway transportation (including air mail)	thous. tons	0.88	95.0	—

[1] The yield in the column for 1932 refers to the average yield during 1928-32.

[2] All index figures for length of lines and quantity of rolling stock are given as of the end of the year.

[3] As of the beginning of the year.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
9. Average daily carloading . . .	thousand freight cars	51.4	79.0	153.7
10. Passenger traffic:	bill. pass gr. km.			
a) Railroad transportation . . .		83.7	110.0	131.4
b) River transportation	"	4.5	7.4	164.4
c) Maritime transportation . . .	"	1.0	1.4	140.0
VIII. Communication[1]				
1. Total volume of output of communication systems	mill. statistical units	9,800.0	20,500.0	209.2
2. Length of inter-urban telegraph and telephone lines (inclusive of local communication) . . .	thous. km.	1,515.0	3,830.0	252.8
3. Installed capacity of urban telephone exchanges	thousand subscribers' lines	492.6	970.0	196.6
4. Rural soviets supplied with telephone service	%	38.8	100.0	—
5. Number of radio broadcasting stations	units	57	88	154.4
6. Number of radio telegraph and telephone broadcast transmitters (exclusive of local transmitters)	"	73	294	402.7
7. Network of post offices and postal sub-stations	thousands	44.6	70.5	160.4
IX. Available Power and Mechanization				
1. Power available in industry . .	kwh. per worker	3,030	5,300	174.9
2. Electric power available in industry	"	2,100	4,670	222.4
3. Mechanization of laborious processes in industry:				
a) Coal (cutting)	%	65.4	93.0	—
b) Peat (extracting)	"	49.7	71.7	—
c) Timber (mechanized haulage) .	"	4.4	28.3	—
d) Iron and steel industry (proportion of pig iron produced in fully mechanized blast furnaces)	"	25.5	80.0	—
4. Mechanization of loading and unloading in railroad transportation	"	18.3	57.0	—

[1] Index figures are given as of the end of the year.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
5. Mechanization in agriculture				
a) Ploughing, including autumn ploughing	%	19.0	80.0	—
b) Grain harvesting by tractor-drawn harvesters	„	10.0	60.0	—
c) Cultivation of fallow land and row crops (by tractor-drawn cultivators)	„	7.0	70.0	—
d) Threshing (by threshing machines)	„	40.0	85.0	—
X. Labour and Cadres				
1. Total number of workers and employees (yearly average) . of which:	thousand persons	22,942.8	28,909.0	126.0
a) Workers in large-scale industry	„	4,668.5	6,361.0	136.3
b) Transportation	„	2,222.0	2,776.0	124.9
of which: Railroad workers	„	1,526.5	1,666.0	109.1
c) Construction	„	3,125.8	3,425.0	109.6
d) Agriculture	„	2,857.5	3,575.0	125.1
2. Total number of specialists in all branches of national economy . of which:	„	2,737.2	4,009.9	146.5
Industry	„	331.3	520.0	157.0
Agriculture	„	217.6	425.0	195.3
Transportation and communication	„	107.0	174.6	163.2
3. Productivity of labour:				
a) Industry: output per worker in large-scale industry	%	—	—	163.0
b) Construction: output per worker in the construction industry proper	„	—	—	175.0
c) Transportation: by railroad (ton-km. per worker)	„	—	—	143.0
4. Total wage fund of workers and employees	mill. rbls.	32,737.7	50,742.0	155.0
5. Funds for cultural and social services for non-agricultural workers	„	4,308.4	9,284.3	215.5
6. Real wages	%	—	—	196.0
XI. Production Costs				
1. Lowering of production costs:				
a) In industry	„	—	—	26.0
b) In agriculture (State farms under P. C. of State Farms)	„	—	—	63.3

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
c) Railroad transportation	%	—	—	10.5
d) Construction industry proper	"	—	—	40.0
e) Trade (socialized)	"	—	—	26.0
XII. Commodity Circulation and Retail Prices				
1. Consumers' manufactured goods marketed (1932 prices)	mill. rbls.	14,788	38,357	259.4
2. Retail commodity turnover (1932 prices, exclusive of the tobacco and alcohol groups)	"	31,915	80,000	250.7
of which:				
a) Volume of State and co-operative trade	"	27,115	67,300	248.2
b) Volume of public catering	"	4,800	12,700	264.6
3. Retail commodity turnover (exclusive of the tobacco and alcohol groups):				
a) Urban	"	23,075	55,125	238.9
b) Rural	"	8,840	24,875	281.4
4. Public catering output (annual total)		9,700	25,150	259.3
a) Urban	"	8,000	20,650	258.1
b) Rural	"	1,700	4,500	264.7
5. Retail stores, etc., in socialized trade as of end of year [1]	thous. units	295.6	405.0	137.0
6. Centralized State resources of agricultural products:				
a) Grains	thous. tons	18,938.0	30,000.0	158.4
b) Meat	"	680.4	1,334.0	196.1
c) Potatoes	"	4,642.0	7,620.0	164.2
d) Milk and dairy products (milk equivalents)	"	2,100.0	5,841.0	278.1
e) Cotton (fibre)	"	382.0	693.0	181.4
f) Flax (fibre)	"	287.0	645.0	224.7
g) Sugar beet	mill. centn.	61.1	270.0	441.8
h) Tobacco	thous. tons.	49.9	121.0	242.4
7. Resources of collective-farm trade:				
a) Grains	"	917.0	4,500.0	490.7
b) Meat	"	223.6	902.5	403.6
c) Potatoes	"	3,999.0	7,340.0	183.5
d) Milk and dairy products (milk equivalents)	"	1,742.0	3,026.0	173.7
8. Reduction in general level of 1933 retail prices in co-operative and State trade	%	—	—	35.0

[1] Exclusive of the stationary collective-farm trading points.

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
XIII. Housing and Municipal Services				
1. Total available housing at end of year	mill. m^2	185.06	246.45	133.2
of which:				
In the socialized sector	"	96.30	159.49	165.6
2. Housing reserved for factory workers, according to principal branches of industry:				
a) Coal	"	5.22	10.42	199.5
b) Iron and steel	"	2.39	8.43	352.7
c) Machinery production	"	1.80	9.42	523.4
3. Average living space allowance per person	m^2	4.66	5.35	114.8
4. Average living space allowance per person, according to principal branches of industry:				
a) Coal	"	3.50	7.00	200.0
b) Iron and steel	"	4.50	6.00	133.3
c) Machinery production	"	4.90	6.00	122.4
5. Number of cities supplied with water-works at end of year	units	366	440	120.2
6. System of street water mains	thous. km.	10.6	16.4	154.6
7. Average daily water supply at end of year	thous. m^3	1,654.0	3,600.0	217.7
8. Number of cities having sewerage systems, as of end of year	units	55	125	227.2
9. System of street sewerage	thous. km.	3.2	7.4	229.1
10. Number of towns having street cars, as of end of year	units	50	70	140.0
11. Number of street cars	thousands	8.0	15.0	187.5
12. Paved streets	mill. m^2	135	190	140.7
XIV. Public Health				
1. Number of hospital beds in urban districts	thousands	230.0	331.0	143.9
2. Number of hospital beds in rural districts	"	107.0	212.0	198.1
3. Number of hospital beds per thousand urban inhabitants	units	5.38	7.0	130.1
4. Number of hospital beds per thousand rural inhabitants	"	1.23	1.9	154.5
5. Number of accommodations in permanent nurseries	thousands	624.0	1,520.0	243.6
of which:				
a) Urban	"	273.8	720.0	263.0
b) Rural	"	350.2	800.0	228.4
6. Number of accommodations in seasonal nurseries in rural places	"	3,920.0	9,000.0	229.6

SUMMARY TABLE OF PRINCIPAL INDICES—*continued*

Indices	Units of measurement	1932	1937	1937 in % of 1932
7. Number of beds in rest homes under the All-Union Central Council of Trade Unions	thousands	72.0	113.0	156.9
8. Number of persons accommodated in rest homes (per thousand insured)	persons	40.3	75.0	186.1
9. Number of beds in health resorts and sanatoriums	thousands	66.4	110.2	166.0
10. Number of physicians	thous. per.	76.3	97.0	127.1
XV. Education				
1. Number of persons attending general and vocational schools	millions	24.4	35.6	145.9
2. Number of persons attending general and vocational schools (schools of universal education, workers' colleges, factory vocational schools, middle technical schools and colleges, per thousand of populaton)	persons	147.2	197.0	133.8
3. Number of pupils in schools of universal education	millions	21.7	29.9	137.8
4. Number of students in colleges and middle technical schools	"	1.3	1.8	142.1
5. School accommodations (elementary and middle schools of universal education)	mill. m^3	143.2	203.0	141.8
XVI. Press				
1. Newspaper circulation, aggregate per issue	million copies	35.5	66.0	185.9
2. Books and periodicals (standard printed sheets: 20 tons of paper per million printed sheets)	million ptd. sheets	3,263.3	6,875.0	210.7
XVII. Art				
Total number of places of entertainment (motion-picture houses, theatres, circuses, etc.)	thousands	26.9	71.5	265.3
of which:				
Motion-picture installations for public use (exclusive of those in schools, Red Army buildings, etc.)	"	26.2	70.0	267.6
XVIII. Science				
Scientific research cadres	thousand persons	44.1	50.0	113.4

INDICES OF THE ELECTRIFICATION PLAN OF THE U.S.S.R.

Table 1

Indices	Units of measurement	Absolute figures						1937 in % of 1932
		1932	1933	1934	1935	1936	1937	
I. Total capacity of electric power stations (at end of year)	thousand kw.	4,696.0	5,450.3	6,647.9	7,874.0	9,290.0	10,900.0	232.1
of which:								
1. Regional power stations [1]	„	3,007.5	3,670.0	4,563.2	5,553.5	6,672.5	7,893.5	262.5
of which:								
a) Under Chief Power Board	„	2,653.0	3,217.5	3,922.7	4,655.0	5,625.0	6,646.0	250.5
b) Industrial (of regional importance)	„	354.5	452.5	640.5	898.5	1,047.5	1,247.5	351.9
2. Industrial (exclusive of stations of regional importance)	„	1,319.4	1,364.9	1,588.4	1,719.9	1,900.0	2,026.5	154.7
3. Local stations (under P.C. of Municipal Services)	„	254.9	294.2	357.6	434.1	510 0	600.0	235.3
4. Agricultural	„	53.0	60.0	72.0	97.0	130.0	180.0	339.6
5. Miscellaneous (under P.C. of Transportation, Waterway Transportation and others)	„	61.2	61.2	67.2	69.5	77.5	200.0	326.8
Capacity of regional power stations, in per cent of total	%	64.0	67.3	68.6	70.5	71.8	72.4	—
II. Total capacity put in operation	thous. kw.	689.6	800.0	1,205.3	1,276.5	1,457.7	1,639.5	237.7
of which:								
Stations of regional importance	„	554.5	708.2	900.9	1,024.4	1,133.0	1,224.0	220.7
of which:								
Under Chief Power Board	„	464.5	610.2	712.9	766.4	984.0	1,024.0	220.5
III. Total electric power generated	mill. kwh.	13,390.0	15,855.0	19,000.0	24,000.0	30,000.0	38,000.0	283.8
of which:								
1. Regional stations	„	9,188.0	11,400.0	14,100.0	18,300.0	23,300.0	29,750.0	323.8
of which:								
a) Under Chief Power Board	„	8,268.0	10,250.0	12,500.0	15,600.0	19,500.0	24,500.0	296.3
b) Industrial (of regional importance)	„	920.0	1,150.0	1,600.0	2,700,0	3,800.0	5,250.0	570,7

2. Industrial (exclusive of stations of regional importance)	"	3,256.0	3,418.0	3,725.0	4,300.0	4,960.0	6,000.0	184.3
3. Local stations	"	709.0	780.0	900.0	1,050.0	1,300.0	1,600.0	225.7
4. Agricultural	"	74.0	92.0	110.0	150.0	220.0	300.0	405.4
5. Miscellaneous (under People's Commissariats of Transportation, Waterway Transportation and others)	"	163.0	165.0	165.0	200.0	220.0	350.0	214.7
Of the total output, hydro-electric stations of regional importance	"	668.0	1,023.0	1,856.0	3,000.0	4,150.0	5,800.0	868.3
Output of regional power stations, in per cent of total	%	68.6	72.0	74.2	76.2	77.8	78.3	—
Power output of regional hydro-electric stations, in per cent of total output of regional power stations	"	7.3	9.0	13.2	16.2	17.7	19.5	—
Output of electric power by all stations in % of preceding year	"	124.5	118.4	119.8	126.3	125.0	126.7	—
IV. Annual use factor of installed capacity:								
All electric power stations	hours	3,100.0	3,240.0	3,300.0	3,380.0	3,560.0	3,800.0	122.6
of which:								
Regional stations	"	3,460.0	3,540.0	3,630.0	3,780.0	3,900.0	4,200.0	121.4
V. Output of heat power by the central heat-and-power plants under the Chief Power Board	thousand mega calories	1,864.6	2,500.0	3,400.0	5,000.0	7,500.0	11,000.0	589.9
VI. Consumption of conventional fuel per kwh. delivered at the bus bar by the Chief Power Board Stations	kg.	0.84	0.79	0.75	0.72	0.69	0.66	78.6
VII. Production cost of 1 kwh. usefully delivered to the consumer by the Chief Power Board Stations	kopeks	5.99	5.80	5.60	5.25	4.80	4.25	70.9
VIII. Length of high-voltage transmission lines of the Chief Power Board Stations	km.	9,820.0	12,000.0	—	—	—	26,250.0	267.3

[1] Within a scope comparable to the plan of 1934.

II. PLAN OF CONSTRUCTION

Table 1

CONSTRUCTION AND ESTABLISHMENTS PUT INTO OPERATION DURING THE FIRST AND SECOND FIVE-YEAR PLAN PERIODS (1928-29 to 1932, and 1933 to 1937, in million rubles)

Branches of national economy	First Five-Year Plan period (1928-29 to 1932)		Second Five-Year Plan period (1933 to 1937)			Second Five-Year Plan period in % of First Five-Year Plan period		Percentage of total			
			Volume of construction					First Five-Year Plan period		Second Five-Year Plan period	
	Volume of construction	Establishments put into operation	In prices of plan of 1933	In prices of year indicated	Establishments put into operation	By volume of construction	By enterprises put into operation	Volume of construction	Establishments put into operation	Volume of construction	Establishments put into operation
I. Industry	24,789	15,728	69,545	62,497	69,050	280.5	439.1	49.08	40.76	52.13	52.30
of which:											
Group "A"	21,292	13,214	53,442	48,223	53,554	251.0	405.3	42.16	34.24	40.06	40.56
Group "B"	3,497	2,514	16,103	14,274	15,496	460.5	616.4	6.92	6.52	12.07	11.74
II. Agriculture	9,687	9,234	15,239	14,061	15,379	157.3	166.5	19.18	23.93	11.42	11.65
of which:											
State farms	4,475	4,250	5,475	5,093	5,510	122.3	129.6	8.86	11.01	4.10	4.17
Machine and tractor stations	1,173	1,135	6,360	5,788	6,425	542.2	566.1	2.32	2.94	4.77	4.87
III. Transportation	8,933	7,723	26,342	23,845	25,643	294.9	332.0	17.68	20.02	19.75	19.42
of which:											
Railways	6,398	5,550	17,364	15,765	17,220	271.4	310.3	12.66	14.38	13.03	13.04
Waterways	1,189	975	4,316	3,934	3,833	363.0	393.1	2.35	2.52	3.23	2.90
Motor transportation	1,100	1,000	3,455	3,069	3,410	314.1	341.0	2.17	2.59	2.59	2.58
Civil aviation	246	198	1,207	1,077	1,180	490.6	595.9	0.50	0.53	0.90	0.90
IV. Communication	565	495	1,679	1,566	1,700	297.2	343.4	1.11	1.28	1.26	1.29

V. Circulation and distribution . . .	943	900	1,740	1,556	1,731	184.6	192.3	1.90	2.33	1.30	1.31
VI. Construction for cultural, social and administrative purposes [1] .	5,585	4,506	18,855	16,558	18,527	—	—	11.05	11.68	14.14	14.03
Total	50,502	38,586	133,400	120,083	132,030	264.1	342.2	100.00	100.00	100.00	100.00
of which:											
Housing and municipal construction and construction for cultural and social purposes . . .	10,320	8,795	32,499	28,033	32,435	314.9	368.8	20.43	22.77	24.36	24.57
including:											
1. Housing construction	4,640	3,775	13,412	11,480	13,800	289.0	365.6	9.18	9 78	10.05	10.45
of which:											
Urban housing and housing reserved for factory workers . .	4,040	3,175	12,502	10,723	12,874	309.4	405.5	8.00	8.23	9.37	9.75
2. Municipal construction	1,850	1,700	7,145	6,295	6,844	386.2	402.5	3.66	4.40	5.36	5.18
of which:											
Urban	1,280	1,200	6,195	5,459	5,900	483.3	491.6	2.53	3.11	4.64	4.47
3. Education	1,150	1,000	3,979[2]	3,378	3,920	346.0	392.0	2.28	2.59	2.98	2.97
4. Construction for training of cadres	1,100	900	2,134	1,854	2,220	193.8	246.7	2.18	2.33	1.60	1.70
5. Public health	730	620	3,498[3]	2,931	3,320	479.2	535.5	1.44	1.60	2.62	2.51
6. Construction for workers' supply.	850	800	2,331	2,095	2,331	274.1	291.3	1.69	2.07	1.75	1.76
Over and above the total volume of construction:											
a) Construction by collective farms and collective farmers expending their own resources and labour	1,126	1,126	5,000	—	5,000	444.0	444.0	2.23	2.92	3.75	3.79
b) Roads built by labour contributed by the population . . .	840	830	1,700	—	1,700	202.4	204.8	1.66	2.15	1.27	1.29

[1] The figures for construction for cultural and social purposes do not include investments specified in the plans of industry and other branches of national economy. The total volume of construction for cultural and social purposes is indicated below.

[2] Volume of construction for educational purposes exclusive of departmental construction (People's Commissariats of Education and motion picture installations) totals 3,167,000,000 rubles.

[3] Construction for public health purposes exclusive of departmental construction totals 2,875,000,000 rubles.

Table 2

CONSTRUCTION ACCORDING TO BRANCHES OF NATIONAL ECONOMY
(in millon rubles, in prices of plan of 1933)

Branches of national economy	1933	1934	1935	1936	1937	Total for Second Five-Year Plan period	Percentage of total			1937 in % of 1933
							For Second Five-Year Plan period	1933	1937	
I. Industry	10,030	12,976	15,358	16,034	15,147	69,545	52.13	55.76	47.33	151.0
of which:										
Group "A"	8,400	10,632	11,299	11,616	11,495	53,442	40.06	46.70	35.92	136.8
Group "B"	1,630	2,344	4,059	4,418	3,652	16,103	12.07	9.06	11.41	224.0
II. Agriculture	2,100	2,724	3,102	3,518	3,795	15,239	11.42	11.67	11.86	180.7
of which:										
State farms	1,025	1,268	1,041	1,060	1,081	5,475	4.10	5.69	3.38	105.4
Machine and tractor stations	713	955	1,187	1,590	1,915	6,360	4.77	3.96	5.98	268.6
III. Transportation	3,015	4,970	5,324	5,979	7,054	26,342	19.75	16.76	22.04	234.0
of which:										
Railways	2,065	3,365	3,630	3,915	4,389	17,364	13.03	11.48	13.71	212.5
Waterways	520	970	910	880	1,036	4,316	3.23	2.89	3.24	199.2
Motor transportation	330	486	591	881	1,167	3,455	2.59	1.83	3.65	353.8
Civil aviation	100	149	193	303	462	1,207	0.90	0.56	1.44	462.1
IV. Communication	202	342	346	372	417	1,679	1.26	1.12	1.31	206.4
V. Circulation and distribution	238	410	345	360	387	1,740	1.30	1.33	1.21	162.6

VI. Construction for cultural, social and administrative purposes[1]	2,404	3,689	3,516	4,046	5,200	18,855	14.14	13.36	16.25	216.3
Total	17,989	25,111	27,991	30,309	32,000	133,400	100.00	100.00	100.00	177.8
of which:										
Housing and municipal construction and construction for cultural and social purposes	3,513	5,575	6,635	7,715	9,061	32,499	24.36	19 53	28.32	257.9
Over and above total volume of construction:										
a) Construction by collective farms and collective farmers expending their own resources and labour .	500	700	950	1,250	1,600	5,000	3.75	2.78	5.00	320.0
b) Roads built by labour contributed by the population	285	310	335	365	405	1,700	1.27	1.58	1.26	142.2

[1] The figures for construction for cultural and social purposes do not include investments specified in the plans of industry and other branches of national economy. The total volume of construction for cultural and social purposes is indicated below.

Table 3

CONSTRUCTION ACCORDING TO BRANCHES OF NATIONAL ECONOMY
(in million rubles, in prices of the year indicated)

Branches of national economy	1933	1934	1935	1936	1937	Total for the 5 years
I. Industry	10,030	12,976	14,155	13,408	11,928	62,497
of which:						
Group "A"	8,400	10,632	10,401	9,713	9,077	48,223
Group "B"	1,630	2,344	3,754	3,695	2,851	14,274
II. Agriculture	2,100	2,724	2,837	3,120	3,280	14,061
of which:						
State farms	1,025	1,268	920	935	945	5,093
Machine and tractor stations	713	955	1,060	1,410	1,650	5,788
III. Transportation	3,015	4,970	4,933	5,140	5,787	23,845
of which:						
Railways	2,065	3,365	3,372	3,360	3,603	15,765
Waterways	520	970	837	755	852	3,934
Motor transportation	330	486	544	755	954	3,069
Civil aviation	100	149	180	270	378	1,077
IV. Communication	202	342	322	335	365	1,566
V. Circulation and distribution	238	410	312	300	296	1,556
VI. Construction for cultural, social and administrative purposes [1]	2,404	3,689	3,145	3,345	3,975	16,558
Total	17,989	25,111	25,704	25,648	25,631	120,083
of which:						
Housing and municipal construction and construction for cultural and social purposes	3,513	5,567	5,955	6,263	6,735	28,033

[1] The figures for construction for cultural and social purposes do not include investments specified in the plans of industry and other branches of national economy. The total volume of construction for cultural and social purposes is indicated below.

Table 4

ESTABLISHMENTS PUT INTO OPERATION ACCORDING TO BRANCHES OF NATIONAL ECONOMY

(in million rubles, in prices of plan of 1933)

Branches of national economy.	1933	1934	1935	1936	1937	Total for the five years	Percentage of total			1937 in % of 1933
							For the five years	1933	1937	
I. Industry	9,044	11,180	14,215	15,801	18,810	69,050	52.30	54.68	52.35	208.0
of which:										
Group "A"	7,619	9,230	11,150	12,130	13,425	53,554	40.56	46.06	37.36	176.2
Group "B"	1,425	1,950	3,065	3,671	5,385	15,496	11.74	8.62	14.99	377.9
II. Agriculture	2,150	2,770	3,185	3,495	3,779	15,379	11.65	13.00	10.52	175.8
of which:										
State farms	1,050	1,270	1,070	1,055	1,065	5,510	4.17	6.35	2.96	101.4
Machine and tractor stations	730	950	1,225	1,600	1,920	6,425	4.87	4.41	5.34	263.0
III. Transportation	2,598	4,255	5,595	5,763	7,432	25,643	19.42	15.71	20.68	286.8
of which:										
Railways	1,770	3,100	3,500	3,850	5,000	17,220	13.04	10.70	13.91	282.5
Waterways	383	545	1,320	723	862	3,833	2.90	2.32	2.40	225.1
Motor transportation .	330	480	585	880	1,135	3,410	2.58	2.00	3.16	343.9
Civil aviation	115	130	190	310	435	1,180	0.90	0.69	1.21	378.2
IV. Communication	186	295	370	397	452	1,700	1.29	1.12	1.26	243.0
V. Circulation and distribution	236	400	335	359	401	1,731	1.31	1.43	1.12	170.0

Table 4—continued

Branches of national economy	1933	1934	1935	1936	1937	Total for the five years	Percentage of total: For the five years	Percentage of total: 1933	Percentage of total: 1937	1937 in % of 1933
VI. Construction for cultural, social and administrative purposes[1] . . .	2,325	3,600	3,587	3,960	5,055	18,527	14.03	14.06	14.07	217.4
Total	16,539	22,500	27,287	29,775	35,929	132,030	100.00	100.00	100.00	217.2
of which:										
Housing and municipal construction, and construction for cultural and social purposes . .	3,408	5,589	6,596	7,829	9,013	32,435	24.57	20.60	25.08	264.3
Over and above the total volume of construction:										
a) Construction by collective farms and collective farmers expending their own resources and labour .	500	700	950	1,250	1,600	5,000	3.79	3.02	4.48	320.0
b) Roads built by labour contributed by the population . . .	285	310	335	365	405	1,700	1.29	1.72	1.13	142.1

[1] The figures for establishments put into operation in the line of construction for cultural and social purposes do not include construction specified in the plans of the industrial People's Commissariats and other departments. The total volume of construction for establishments put into operation in the line of construction for cultural and social purposes is indicated below.

Table 5

FIXED CAPITAL IN OPERATION AT REPLACEMENT VALUE
(in million rubles; in 1933 prices)

Branches of national economy	Average annual fixed capital							Capital of 1937 in % of capital of 1932	Percentage of total fixed capital		
	1928	1932	1933	1934	1935	1936	1937		1928	1932	1937
I. Industry	10,527	25,542	32,155	39,840	49,599	61,288	75,180	294.3	21.3	30.0	38.5
of which:											
Group "A"	6,024	18,412	24,041	30,770	38,775	47,893	58,217	316.2	12.2	21.6	29.8
Group "B"	4,503	7,130	8,114	9,070	10,824	13,395	16,963	237.9	9.1	8.4	8.7
II. Agriculture	1,916	11,367	13,460	14,715	16,815	19,460	22,560	198.5	3.9	13.3	11.6
of which:											
State farms	273	2,700	3,534	4,315	4,900	5,725	6,300	233.3	0.5	3.2	3.2
Machine and tractor stations	—	825	1,314	1,905	2,665	3,680	4,970	602.4	—	1.0	2.5
III. Transportation	15,373	19,839	21,906	24,334	28,252	32,812	38,469	194.0	31.1	23.3	19.7
of which:											
Railways	11,529	14,233	15,513	17,098	19,568	22,369	26,163	183.8	23.3	16.7	13.4
Waterways	1,870	2,414	2,558	2,870	3,599	4,392	4,937	204.5	3.8	2.8	2.5
Motor transportation	1,974	3,077	3,626	4,094	4,715	5,516	6,573	214.0	4.0	3.6	3.4
Civil aviation	—	115	209	272	370	535	796	692.2	—	0.1	0.4
IV. Communication	431	721	878	1,058	1,336	1,662	2,026	281.0	0.9	0.8	1.1
V. Circulation and distribution	722	1,281	1,480	1,688	1,950	2,162	2,390	186.5	1.5	1.5	1.2
VI. Cultural and social services (education, public health and municipal services)	8,912	10,599	11,195	13,504	16,372	19,803	23,894	225.4	18.0	12.5	12.3

Table 5—continued

Branches of national economy	Average annual fixed capital							Capital of 1937 in % of capital of 1932	Percentage of total fixed capital		
	1928	1932	1933	1934	1935	1936	1937		1928	1932	1937
VII. Available housing space . . .	10,673	14,513	15,920	17,482	19,969	23,109	26,811	184.7	21.6	17.0	13.7
of which:											
Urban	10,538	12,436	13,594	14,971	17,182	19,979	23,301	187.4	21.3	14.6	11.9
Rural	135	2,077	2,326	2,511	2,787	3,130	3,510	169.0	0.3	2.4	1.8
VIII. Miscellaneous	840	1,360	2,194	2,939	3,622	3,794	3,863	284.0	1.7	1.6	1.9
Total	49,394	85,222	99,188	115,560	137,915	164,090	195,193	229.0	100.0	100.0	100.0

Notes: 1. The fixed capital is calculated at its replacement value at domestic production prices of 1933. The value of imported equipment constituting part of the fixed capital has been converted into domestic production prices.

2. Under the subdivisions of industry, agriculture, transportation, communication, and circulation and distribution only the productive capital is given. Housing resources and the fixed capital of cultural and social institutions of industry and other branches of national economy are given under the corresponding subdivision.

3. Repair works and industrial enterprises of the transportation and communication systems, also electric power stations and industrial enterprises for the primary processing of agricultural products (agricultural industry) and industrial enterprises and electric power stations under municipal control are included in the industrial capital.

4. The fixed capital invested in motor transportation includes the labour expended by the population in road building the fixed capital of agriculture includes investments by the collective farms and collective farmers out of their own resources and contribution of their own labour.

5. The fixed capital of agriculture does not include livestock, or capital transferred during the Second Five-Year Plan period from the private to the socialized sector of agriculture as a result of collectivization.

Table 6

GROWTH OF PRODUCTION CAPACITIES DURING THE SECOND FIVE-YEAR PLAN PERIOD

Branches and kinds of production	Units of measurement	Capacity as of January 1, 1933	Capacity as of January 1, 1938	Capacity on Jan. 1, 1938 in % of capacity on Jan. 1, 1933
P. C. OF HEAVY INDUSTRY				
Electric Power Stations				
Total capacity of the U.S.S.R.	thousand kw.	4,696	10,900	232.1
of which:				
Regional stations (Chief Power Board)	" "	2,653	6,646	250.5
Industrial stations	" "	1,674	3,234	193.2
Coal Industry				
Coal output	number of pits	437	524	119.9
	million tons of coal	110.7	238.8	215.7
Oil Industry				
Primary oil refining	million tons of crude oil	23.4	40.9	174.8
Cracking plants	million tons of distillation products	3.0	15.8	526.6
Iron and Steel Industry				
Pig iron	number of blast furnaces	103	139	134.9
	volume in m^3	36,911	78,429	212.5
Steel:				
Open-hearth departments	number of open-hearth furnaces	294	437	148.6
	hearth area in m^2	6,688	13,093	196.0
Converter departments	thousand tons	1,250	3,309	264.0
Rolled steel	number of rolling mills	262	362	138.2
	capacity in milliontons	7.0	19.0	271.4
Non-ferrous metals				
Copper	thousand tons	94	207	220.2

Table 6—continued

Branches and kinds of production	Units of measurement	Capacity as of January 1, 1933	Capacity as of January 1, 1938	Capacity on Jan. 1, 1938 in % of capacity on Jan. 1, 1933
Machinery Industry				
Tractors (exclusive of row crop tractors)	thousands, in terms of 15 h.p. tractors	80	276.7	345.9
Motor cars	thousands	92	360	391.3
Trunk line locomotives in "E" and "SU" equivalents	units	1,265	4,050	320.1
Type "NKPS" freight cars	thousands, in 2-axle equivalents	40	155	387.5
Generators (turboand hydro)	thousand kw.	1,440	3,400	236.1
Transformers	" "	3,500	7,000	200.0
Steam boilers	thousand m^2	250	625	250.0
Turbines (steam and hydraulic)	thousand kw.	800	2,800	350.0
Agricultural machinery	million rubles, in 1926-27 prices	750	900	120.0
Electric welding sets	million rubles, in 1926-27 prices	24	48	200.0
Building materials				
Cement	million barrels	31.6	54.7	173.1
Fire clay (special works)	thousand tons	750	1,530	204.0
Dinas clay (special works)	"	220	563	255.9
High-grade asbestos	"	105	286	272.4
Glass	"	550	1,100	200.0
P. C. OF LIGHT INDUSTRY				
Cotton fabrics	million metres	3,600	5,300	147.2
Woollen fabrics	"	120	250	208.3
Linen fabrics	million m^2	280	630	225.0
Knit goods	thousand tons	30	105	350.0
Hemp and jute goods	"	66	185	280.4
Boots and shoes	million pairs	100	200	200.0
P. C. OF TIMBER				
Saw-mill products	million m^3	22.0	31.2	141.8
Plywood	thousand m	525	804	153.1
Paper	thousand tons	625	1,120	179.2
Cellulose	"	260	551	211.9

Table 6—continued

Branches and kinds of production	Units of measurement	Capacity as of January 1, 1933	Capacity as of January 1, 1938	Capacity on Jan. 1, 1938 in % of capacity on Jan. 1, 1933
P. C. OF SUPPLY				
Meat (big meat-packing plants)	thousand tons of meat	310	792	255.4
Sugar	daily quantity of beets processed, in thousand tons	108.6	153.7	141.5
Vegetable oil	thousand tons of oil	600	815	135.8
Distilleries	million dekalitres	53.7	80.0	149.0
Cold storage	capacity, in thousand tons	80.9	180.0	222.5
Grease and tallow (inclusive of co-operative industry)	soap products, in terms of 40% fatty matter, in thousand tons	958.5	1,482.0	154.8
Flour and cereal products (Produce Procurement Committee of the Council of People's Commissars):				
Flour	million tons of standard flour	18.0	28.8	160.0
Cereal products	thousand tons	1,449	2,328	160.7

Table 7

PLAN OF CONSTRUCTION FOR HOUSING, MUNICIPAL, CULTURAL AND SOCIAL PURPOSES, FOR THE TRAINING OF CADRES AND FOR SCIENTIFIC INSTITUTIONS (in mill. rubles, for the Five-Year Plan period 1933-37)

People's Commissariats and Departments	Housing construction	Municipal construction	Education and public health	Constr. for workers' supply	Constr. for training of cadres	Constr. for scientific institutions
P. C. of Heavy Industry	6,000	650	560	425	430	320
P. C. of Light Industry	1,100	26	180	205	155	53
P. C. of Timber	492	54	114	117	52	55
P. C. of Supply	450	64	67	280	67	48
P. C. of Foreign Trade	55	9	16	12	17	3
P. C. of Agriculture	410	8	98	24	200	110
P. C. of State Farms	500	6	75	19	50	15
P. C. of Transportation	1,100	13	69	230	94	30
P. C. of Waterway Transportation	240	5	33	39	26	6
Central Board of Highway Transportation	95	—	4	65	80	8
Chief Board of Civil Aviation	120	78	28	23	80	16
P. C. of Communication	100	—	5	37	50	15
All-Union Co-operative Association	100	—	28	800	37	2
Handicraft co-operative organizations	30	—	32	—	30	6
Available housing space of Soviet Executive Committees and co-operative dwelling house ass'ns.	1,815	—	—	—	—	—
Municipal services	—	5,092	4	12	44	5
Subway construction	70	1,103	14	13	—	—
Education	—	—	2,707	—	275	168
Public health	—	—	2,875	30	170	—
Produce Procurement Committee of the Council of People's Commissars	40	1	8	—	25	4
Chief Board of the Motion Picture and Photography Industry	25	1	460	—	15	3
Chief Northern Sea Route Board	20	—	—	—	1	6
Miscellaneous	650	35	100	—	236	130
Total	13,412	7,145	7,477	2,331	2,134	1,003

Table 8

PLAN OF CONSTRUCTION ACCORDING TO PEOPLE'S COMMISSARIATS
(in million rubles, in prices of plan of 1933)

People's Commissariats and branches of industry	1933	1934	1935	1936	1937	Total for the five years
P. C. of Heavy Industry	7,700	9,290	9,880	10,060	9,830	46,760
of which:						
Electric power	700	990	1,025	1,275	1,360	5,350
Coal	650	667	700	725	758	3,500
Oil	545	770	1,000	1,175	1,210	4,700
Ore mining	46	57	69	83	95	350
Iron and steel	1,665	1,825	2,025	2,000	1,825	9,340
Non-ferrous metals	690	705	800	800	796	3,791
Machinery	1,280	1,495	1,800	1,750	1,735	8,060
Chemical and coke-chemical	800	1,049	1,050	940	931	4,770
P. C. of Light Industry	580	1,031	2,605	2,900	2,084	9,200
P. C. of Timber	414	571	700	865	900	3,450
P. C. of Supply	780	997	1,150	1,200	1,213	5,340
P. C. of Foreign Trade	90	116	102	90	77	475
P. C. of Agriculture	1,340	1,878	2,165	2,555	2,822	10,760
P. C. of State Farms	650	747	835	865	893	3,990
P. C. of Transportation	2,165	3,707	4,016	4,190	4,622	18,700
P. C. of Waterway Transportation	506	962	886	860	1,031	4,245
of which:						
New waterways	112	457	286	165	196	1,216
Central Board of Highway Transportation	375	542	676	1,020	1,387	4,000
Chief Board of Civil Aviation	115	193	251	390	551	1,500
P. C. of Communication	206	349	350	375	420	1,700
All-Union Co-operative Association	265	293	297	303	352	1,510
Handicraft co-operative organizations	128	139	155	190	238	850
Co-operative dwelling house ass'ns.	86	111	150	200	259	806
Housing construction by Soviet Executive Committees	140	182	220	290	362	1,194
Municipal construction in cities (including subway construction)	725	1,323	1,450	1,600	1,802	6,900
Education	240	458	600	781	1,071	3,150
Public health	238	349	550	760	1,178	3,075
Produce Procurement Committee of the Council of People's Commissars	175	315	180	150	120	940
Chief Board of the Motion Picture and Photography Industry	35	74	138	200	228	675
Chief Northern Sea Route Board	26	29	50	65	80	250
Miscellaneous	1,010	1,455	585	400	480	3,930
Total for the whole of national economy	17,989	25,111	27,991	30,309	32,000	133400

Note: Capital investments in the construction of the White Sea-Baltic Combination are entered under the corresponding People's Commissariats.

Table 9

PLAN OF CONSTRUCTION ACCORDING TO PEOPLE'S COMMISSARIATS
(in million rubles, in prices of the year indicated)

People's Commissariats and Departments	1933	1934	1935	1936	1937	Total for the five years
P. C. of Heavy Industry	7,700	9,290	9,050	8,390	7,725	42,155
P. C. of Light Industry	580	1,031	2,400	2,430	1,635	8,076
P. C. of Timber	414	571	655	710	720	3,070
P. C. of Supply	780	997	1,060	1,010	955	4,802
P. C. of Foreign Trade	90	116	97	80	67	450
P. C. of Agriculture	1,340	1,878	2,040	2,270	2,450	9,978
P. C. of State Farms	650	747	787	767	775	3,726
P. C. of Transportation	2,165	3,707	3,710	3,610	3,770	16,962
P. C. of Waterway Transportation	506	962	816	743	840	3,867
of which:						
New waterways	112	457	265	143	160	1,137
Central Board of Highway Transportation	375	542	620	885	1,140	3,562
Chief Board of Civil Aviation	115	193	235	345	480	1,368
P. C. of Communication	206	349	328	337	368	1,588
All-Union Co-operative Association	265	293	267	251	273	1,349
Handicraft co-operative organizations	128	139	141	159	195	762
Co-operative dwelling house ass'ns.	86	111	134	161	189	681
Housing construction by Soviet Executive Committees	140	182	182	233	264	1,001
Municipal construction in cities (including subway construction).	725	1,323	1,289	1,327	1,379	6,043
Education	240	458	537	633	800	2,668
Public health	238	349	492	618	875	2,572
Produce Procurement Committee of the Council of People's Commissars	175	315	162	124	92	868
Chief Board of the Motion Picture and Photography Industry	35	74	130	180	195	614
Chief Northern Sea Route Board	26	29	47	54	69	225
Miscellaneous	1,010	1,455	525	331	375	3,696
Total for the whole of national economy	17,989	25,111	25,704	25,648	25,631	120,083

Table 10

CONSTRUCTION OPENED FOR SERVICE ACCORDING TO PEOPLE'S COMMISSARIATS

(in million rubles, in prices of plan of 1933)

People's Commissariats and Departments	1933	1934	1935	1936	1937	Total for the five years
P. C. of Heavy Industry	7,000	8,100	9,900	10,500	11,700	47,200
P. C. of Light Industry	500	850	1,500	2,150	3,700	8,700
P. C. of Timber	340	555	655	850	900	3,300
P. C. of Supply	660	950	1,200	1,200	1,340	5,350
P. C. of Foreign Trade	85	110	110	100	95	500
P. C. of Agriculture	1,400	1,865	2,215	2,555	2,820	10,855
P. C. of State Farms	620	765	875	865	895	4,020
P. C. of Transportation	1,850	3,300	3,750	4,200	5,300	18,400
P. C. of Waterway Transportation	380	540	1,300	680	800	3,700
Central Board of Highway Transportation	375	540	660	1,000	1,325	3,900
Chief Board of Civil Aviation	150	175	250	400	525	1,500
P. C. of Communication	190	300	375	400	455	1,720
All-Union Co-operative Association	300	300	275	300	340	1,515
Handicraft co-operative organizations	125	140	155	190	240	850
Housing construction by Soviet Executive Committees and co-operative dwelling house associations	240	300	440	500	620	2,100
Municipal construction in cities (inclusive of Moscow subway)	580	1,300	1,400	1,550	1,770	6,600
Education	265	460	600	775	1,000	3,100
Public health	240	275	525	750	1,110	2,900
Produce Procurement Committee of Council of People's Commissars	146	275	250	170	134	975
Chief Northern Sea Route Board	15	20	40	65	85	225
Chief Board of the Motion Picture and Photography Industry	35	60	130	175	200	620
Miscellaneous	1,043	1,320	682	400	555	4,000
Total	16,539	22,500	27,287	29,775	35,929	132030

III. OUTPUT OF INDUSTRY

OUTPUT OF INDUSTRY IN FIXED PRICES OF 1926-27

Table 1

(in million rubles)

Branches of industry	Absolute figures						Relative figures						
	1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year				
									1933	1934	1935	1936	1937
All industry	43,300.0	46,900.0	55 800.0	64,800 0	76,920.0	92,712.0	214.1	16.5	108.3	119 0	116.1	118.7	120 5
Large-scale industry	38 500.0	42,000.0	50,800 0	59,600.0	71,300 0	86,430.0	224.5	17 5	109.1	121.0	117 3	119.6	121.2
P. C. of Heavy Industry	14,279.1	15 537.2	19,817.5[5]	22,773 9	27,563.2	33 500.0	234.6	18.6	108 8	124.3	117 8	121 0	121 5
P. C. of Timber [1]	1 800 0	1,814.3	2.082 0	2,457.8	2,917.9	3.600 0	200 0	14 9	100 7	114.7	118.0	118.7	123 3
P. C. of Light Industry [2]	7,831.6	8,079.6	8,946 0	10,755.0	14,230 0	19,500 0	249 0	20.0	103.2	110.7	120.2	132.3	137.0
P. C. of Supply	4,634.7	4,836.5	5,992.3	7,168.5	9,080.9	11,870.0	256.1	20.7	104.3	123.9	119.6	126.7	130.7
Produce Procurement Committee of Council of People's Commissars	1,024.7	1,160.1	1,578.5	1,889.0	2,165.0	2,500.0	244.0	19.5	113.2	136.1	119.6	114.6	115.5
Chief Board of Motion Picture and Photography Industry	58.1	80.9	118.0	154.2	219.0	300.0	516.3	38.9	139.2	145.9	130.7	142.0	137.0
I. Heavy Industry													
1. Electric power stations (Chief Power Board)	556 0	691.5	846.5	1.064.0	1,342.5	1,702.5	306.2	25.1	124 4	122.4	125.7	126 2	126.8
2. Coal [3]	633.6	760.0	945 8	1.080.0	1,237.7	1 491.3	235 4	18.7	120.0	124.4	114 2	114.6	120.5
3. Oil	1,331.4	1,324.2	1.689.5	1,862.0	2,299.8	2,865.0	215 2	16.6	99.5	127.6	110 2	123 5	124.6
4. Iron and steel	1,334.4	1,561.0	2,081.2	2,450.0	3.000 0	3,600.0	270 0	22.0	117.0	133.3	117.7	122.4	120.0
5. Non-ferrous metals	572.2	564.7	722.2	903.3	1,204.6	1,611.0	281.5	23.0	98.7	127.9	125.1	133.4	133.7
6. Machinery and metal working	9,410.0	10,646.0	12,648.0	14,560.0	16,810.0	19,500.0	207.2	15.7	113.1	118.8	115.1	115.5	116.0
of which:													
P. C. of Heavy Industry [4]	7,252.0	8,090.0	9,560.0[6]	11,200.0	13,275.0	15,750.0	217.2	16.8	111.6	118.2	117.2	118.5	118.6
a) Automobiles and tractors	575.0	885.0	1,250.0	1,510.0	1,900.0	2,400.0	417.4	33.1	153.9	141.2	120.8	125.8	126.3

b) Transportation equipment [5]	778.6	833.5	1,118.5	1,439.0	1,910.0	2,450.0	314.7	25.8	107.1	134.2	128.6	132.7	128.3
c) Agricultural machinery	348.0	370.0	465.0	555.0	600.0	620.0	178.2	12.3	106.3	125.7	119.4	108.1	103.3
d) Electrical manufacturing, exclusive of communication; also steam turbines	814.0	882.0	1,010.0	1,225.0	1,470.0	1,800.0	221.1	17.2	108.4	114.5	121.3	120.0	122.4
e) Electrical communication	238.0	262.0	339.0	440.0	540.0	650.0	273.1	22.3	110.1	129.4	129.8	122.7	120.4
f) Machine tools and hand tools	188.0	237.0	287.5	385.0	500.0	630 0	335.1	27.4	126.1	121.3	133.9	129 9	126.0
g) Textile machinery	60.1	63.0	75.0	125.0	265.0	350.0	582.4	42.2	104.8	119.0	166.7	212.0	132.1
h) Food products machinery	47.7	49.5	56.0	75.0	100.0	130.0	272.5	22.2	103.8	113.1	133.9	133.3	130.0
i) Precision machinery and precision instruments	241.0	255.0	286.0	325.0	380.0	450.0	186.7	13.3	105 8	112.2	113 6	116.9	118.4
7. Building materials	711.0	691.8	975.1	1,204.1	1,395.5	1,653 3	232.5	18.4	97.3	141.0	123.5	115.9	118.5
of which:													
P. C. of Heavy Industry	494 5	490 6	680.5	864.3	1,017.9	1,190.0	240.6	19 2	99 2	138 7	127.0	117.8	116 9
8. Chemical industry	1,497.1	1,620.0	2,044.0	2,490.9	3,169.8	4,098 5	273.8	22.3	108.2	126.2	121.9	127.3	129.3
of which:													
Basic branches of heavy chemical industry	183.8	243.4	331.2	426.0	648.7	909.7	494.9	37.7	132.4	136.1	128.6	152.3	140.2
II. Timber And Wood-Working Industry	3,186.7	3,206.5	3,846.1	4,337.8	4,982.6	5,888.1	184.7	13.1	100.6	119.9	112.7	114.9	118.2
of which:													
Under the P. C. of Timber [1]	1,800.0	1,814.3	2,082.0	2,457.8	2,917.9	3,600.0	200.0	14.9	100.7	114.7	118.0	118.7	123.3
of which:													
1. Timber cutting	875.0	861.5	965.1	1,132 7	1,315.7	1,567.8	179.1	12.4	98.4	112.0	117.3	116.1	119.1
2. Wood working	636.8	633.1	735.9	863.1	1,048.2	1,277.5	200.6	15.0	99.4	116.2	117.2	121.4	121.9

[1] Exclusive of departments for the utilization of waste products, and auxiliary enterprises.

[2] According to its composition in 1931, including the match and plywood industries, which were transferred to the P. C. of Timber, and the manufacture of scientific school supplies, which was taken over by the People's Commissariat of Education.

[3] Inclusive of small enterprises of local importance.

[4] Inclusive of the output of those boards of the P. C. of Heavy Industry which are not engaged in machinery production. The new output is given in revised prices.

[5] Exclusive of contract jobs in marine shipyards.

[6] For 1934 the new output of the machinery industry is calculated in revised prices which differ somewhat from the prices adopted in the plan of 1934.

Table 1 — continued

Branches of industry	Absolute figures						Relative figures						
	1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year				
									1933	1934	1935	1936	1937
3. Paper	225.3	245.5	281.5	331.0	390.0	549.0	243.7	19.5	109.0	114.7	117.6	117.8	140.8
4 Wood-chemistry (excluding charcoal burning and wood briquettes)	57.3	59.6	78.0	102.2	125.6	155.0	270.5	22.0	104.0	130.9	131.0	122.9	123.4
III. Light Industry													
1. Textiles	4,301.5	4,600.8	5,227.8	6,194.0	8,265.0	11,370.0	264.3	21.5	107.0	113.6	118.5	133.4	137.6
of which:													
Knit goods	504.3	589.0	727.0	900.0	1,400.0	2,300.0	456.1	35.5	116.8	123.4	123.8	155.6	164.3
2. Needle trades	1,510.2	1,510.0	1,550 0	1,860.0	2,300.0	3,130.0	207.1	15.7	99.9	102.6	120.0	123.7	136.1
3. Leather and shoes	1,295.4	1,152.2	1,109.0	1,381.0	1,925 0	2,625.0	202 6	15.2	88.9	96.3	124.5	139.5	136.4
4. Silicate products	195.5	195.0	279.0	340.0	430.0	570.0	291.6	23.9	99.7	143.1	121.9	126.5	132.5
5. Scientific and cultural supplies	261.3	302.2	348.2	425.0	555.0	730.0	279.6	22.8	115.7	115.2	122.1	130.6	131.5
IV. Food Industry													
1. Meat	720.4	648.4	862.0	1,095 0	1,580.0	2,264.0	314.3	25.7	90.0	132.9	127.0	144 3	143.3
2. Fish	261.0	285 0	359.0	392.0	435.0	500.0	191.6	13.9	109.2	126.0	109.2	111.0	114.9
3. Granulated sugar	249.5	332.0	422.5	495.0	600.0	750.0	300.6	24.7	133.1	127.3	117.2	121.2	125.0
4. Vegetable oil	235.0	161.6	211.6	257.0	336 0	450.0	191.5	13.9	68.8	130.9	121.5	130.7	133.9
5. Canned goods	104.4	115.0	129.6	171.0	231.0	307.0	294.0	24.1	110.2	112.7	131.9	135.1	132.9
6. Alcohol	121.1	141.5	185.9	211.0	235.0	266.0	219.7	17.1	116.8	131.4	113.5	111.4	113.2
7. Vodka	438.8	556.0	588.1	600.0	615.0	630 0	143.6	7.5	126.7	105.8	102.0	102.5	102.4
8. Tobacco	208.6	221.9	239.9	285.0	340.0	430 0	206.1	15.6	106.4	108.1	118.8	119.3	126.5
9. Butter	138.9	188.5	197.0	222.0	250.0	315.0	226.8	17.8	135.7	104.5	112.7	112.6	126.0
10. Central kitchens (under the Chief Food Board)	155.0	202.5	250.0	310.0	390.0	500.0	322 6	26.4	130.6	123.5	124.0	125.8	128.2
11. Flour	882.4	1,040.1	1,388.0	1,656.0	1,891.0	2,182.0	247.3	19.8	117.9	133.4	119.3	114.2	115.4
12. Cereal products	142.3	120.0	190.5	233.0	274.0	318.0	223.5	17.4	84.3	158.8	122.3	117.6	116.1

PHYSICAL OUTPUT OF INDUSTRY

Table 2

Classification of output	Units of measurement	Absolute figures						Relative figures					
										In % of preceding year			
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	1933	1934	1935	1936	1937
I. ELECTRIC POWER STATIONS														
1. Total output of electric power .	mill. kwh.	13,390	15,855	19,000	24,000	30,000	38,000	283.8	23.2	118.4	119.8	126.3	125.0	126.7
of which:														
By regional stations (Chief Power Board)	" "	8,268	10,250	12,500	15,600	19,500	24,500	296.3	24.3	124.0	122.0	124.8	125.0	125.6
2. Heat power (Chief Power Board)	thous. mega-cal.	1,865	2,500	3,400	5,000	7,500	11,000	589.9	42.6	134.1	136.0	147.1	150.0	146.7
II. FUEL														
1. Coal (total)	mill. tons	64.33	76.69	96.25	110.00	126.60	152.50	237.1	18.8	119.3	125.5	114.3	115.1	120.5
of which:														
a) P. C. of Heavy Industry [1] .	" "	60.43	72.57	90.43	103.05	118.10	142.30	235.4	18.7	120.0	124.4	114.2	114.6	120.5
b) P. C. of Transportation . . .	" "	2.45	2.70	4.50	5.45	6.50	7.70	320.8	26.3	112.5	166.7	121.1	119.3	118.5
c) Handicraft co-operative organizations	" "	1.45	1.42	1.32	1.50	2.00	2.50	172.4	11.5	97.9	93.0	113.6	133.3	125.0
2. Crude oil and natural gas . . .	" "	22.27	23.02	30.66	35.00	40.50	46.80	210.1	16.0	103.4	133.2	114.2	115.7	115.5
3. Oil refining	" "	20.50	18.90	23.08	24.00	31.00	38.00	185.4	13.2	92.2	122.1	104.0	129.2	122.6
4. Gasoline and ligroine	thous. tons	2,881.00	2,758.00	3,000.00	3,650.00	5,550.00	8,200.00	284.6	23.3	95.7	108.8	121.7	152.1	147.7
5. Kerosene	" "	4,203.00	4,000.00	4,964.00	5,250.00	6,000.00	7,500.00	178.4	12.3	95.2	124.1	105.8	114.3	125.0
6. Peat	mill. tons	13.49	13.15	18.00	21.00	23.00	25.00	185.3	13.2	97.5	136.9	116.7	109.5	108.7
of which:														
Under P. C. of Heavy Industry (All-Union Peat Association) .	" "	10.74	10.00	13.00	15.50	17.20	19.00	176.9	12.1	93.1	130.0	119.2	111.0	110.5
7. Oil shale (All-Union Oil Shale Association)	thous. tons	193	172	450	1,000	1,600	2,600	—	—	89.1	261.6	222.2	160.0	162.5
8. Coke	"	8,409	10,450	13,600	17,000	18,800	21,300	253.3	20.4	124.3	130.1	125.0	110.6	113.3

[1] Inclusive of small pits of local importance.

Table 2 — continued

Classification of output	Units of measurement	Absolute figures						Relative figures						
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year				
										1933	1934	1935	1936	1937
III. MINING														
1. Iron ore	thous. tons	12,063	15,100	21,800	27,850	30,000	34,000	281.9	23.1	125.2	144.4	127.8	107.7	113.3
2. Manganese ore	„	833	1,040	1,700	2,000	2,300	2,700	324.1	26.5	124.8	163.5	117.6	115.0	117.4
IV. IRON AND STEEL														
1. Pig iron [1]	„	6,157	7,250	10,000	12,200	14,000	16,000	259.9	21.0	117.8	137.9	122.0	114.8	114.3
2. Steel	„	5,922	6,852	9,800	12,100	14,800	17,000	289.0	23.5	115.7	143.0	123.4	122.3	114.9
3. Rolled products [2]	„	4,289	4,900	6,600	8,000	10,500	13,000	303.1	24.8	114.2	134.7	121.2	131.2	123.8
of which:														
a) Special rolled steel	„	555	790	1,200	1,400	1,700	2,000	360.4	29.2	142.3	151.9	116.7	121.4	117.6
b) Railroad rails, 1st grade	„	332	350	600	760	1,000	1,300	391.6	31.1	105.4	171.7	126.7	131.6	130.0
4. Iron piping	„	310	360	526	750	995	1,100	354.8	28.8	116.1	146.1	142.6	132.7	110 6
5. Cast iron piping (including the output of the shops under the control of the P. C. of Transportation)	„	130	160	260	340	422	480	369.2	29.9	123.1	162.5	130.7	124.1	113.7
V. MACHINERY PRODUCTION														
A. Transportation equipment:														
1. Steam locomotives (total in "E" and "SU" equivalents)	units	828	987	1,405	1,723	2,145	2,800	338.0	27.6	119.2	142.4	122.6	124.5	130.5
of which (actual units):														
Type "E"	„	678	740	668	640	720	718	105.9	1.2	109.1	90.3	95.8	112.5	99.7
„ "FD"	„	1	30	300	470	650	925	—	—	—	—	156.7	138.3	142.3
„ "SU"	„	147	195	280	370	390	395	268.7	21.9	132.7	143.6	132.1	105.4	101.3
„ "JS"	„	1	5	5	5	40	200	—	—	500.0	100.0	100.0	800.0	500.0
2. Trunk-line electric locomotives	„	1	24	40	55	81	150	—	—	—	166.7	137.5	147.3	185.2
3. Trunk-line Diesel locomotives	„	1	8	20	40	70	110	—	—	—	800.0	250.0	200.0	175.0	157.1
4. Intern. combustion locomotives [3]	„	171	540	1,400	1,400	1,400	1,400	818.7	52.2	315.8	259.3	100.0	100.0	100.0

5. Narrow-gauge locomotives . .	"	52	15	100	150	220	300	576.9	42.0	28.8	666.7	150.0	146.7	136.4
6. Industrial locomotives	"	63	65	100	110	250	400	634.9	44.7	103.2	153.8	110.0	227.3	160.0
7. Passenger cars	"	1,133	1,525	2,000	2,475	3,000	3,500	308.9	25.3	134.6	131.1	123.8	121.2	116.7
8. Total number of freight cars (in 2-axle equivalents)	thousands	22.3	22.8	42.0	51.2	67.4	118.4	530.9	39.6	102.2	184.2	121.9	131.6	175.7
of which:														
a) Type "NKPS" cars (built in the factories of the P. C. of Heavy Industry)	"	17.6	20.0	38.0	45.0	60.0	110.0	625.0	44.3	113.6	190.0	118.4	133.3	183.3
b) Industrial cars	"	1.7	2.0	4.0	6.2	7.4	8.4	494.1	40.9	117.6	200.0	155.0	119.4	113.5
B. Power machinery and electrical machinery industry:														
1. Steam boilers [4]	thous. m^2	115.8	155.0	200.0	280.0	320.0	385.0	332.5	27.2	133.9	129.0	140.0	114.3	120.3
2. Turbines (steam and hydraulic)	thous. kw.	314.0	700.0	810.0	1,100.0	1,420.0	1,500.0	477.7	36.7	222.9	115.7	135.8	129.1	105.6
3. Portable steam engines	units	394	455	600	750	1,200	1,500	380.7	30.7	115.5	131.9	125.0	160.0	125.0
4. Internal combustion motors [5] .	thous. h.p.	182	217	403	800	1,700	2,500	—	—	119.2	185.7	198.5	212.5	147.1
5. Dial telephone exchanges . . .	thous. lines	100	57	98	120	135	170	170.0	11.2	57.0	171.9	122.4	112.5	125.9
C. Automobile and tractor production:														
1. Motor vehicles (total)	thousands	23.9	49.5	72.0	110.0	140.0	200.0	837.0	52.9	207.1	145.5	152.8	127.3	142.9
of which:														
Trucks	"	—	39.3	55.0	88.0	103.0	140.0	—	—	—	139.9	160.0	117.0	135.9
Passenger cars	"	—	10.2	17.0	22.0	37.0	60.0	—	—	—	166.7	129.4	168.2	162.2
2. Tractors	thous. h.p.	774.0	1,205.0	1,730.0	1,699.0	2,188.0	2,500.0	323.0	26.4	155 7	143.6	98.2	128.8	114.3
Tractors (in 15 h.p. equivalents)	thousands	51.6	80.3	115.3	113.3	145.9	166.7	323.0	26.4	155.6	143.6	98.3	128.8	114.3
Tractors (in actual units) . . .	"	50.6	77.4	95	83	84	88.5	174.9	11.8	152.9	122.7	87.4	101.2	105.4
of which:														
a) Caterpillar tractors [6] . . .	"	0.5	2.0	10.0	16.0	34.0	42.5	—	—	400.0	500.0	160.0	212.5	125.0
b) Wheel tractors	"	50.1	75.4	85.0	67.0	50.0	46.0	—	—	148.4	112.7	78.8	74.6	92.0

1 Exclusive of ferro-alloys from electric furnaces.
2 Exclusive of pipes made from ingots or forgings.
3 Inclusive of the output of the Kaluga factory under the control of the P. C. of Transportation.
4 Specialized plants for the manufacture of steam boilers.
5 Specialized plants for the production of internal combustion motors and the Diesel shops of the Kolomna and Sormovo Works.
6 A caterpillar tractor from the Stalin Tractor Works has a rating of 40 h.p. (trailer attached).

Table 2—continued

Classification of output	Units of measurement	Absolute figures						Relative figures						
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year				
										1933	1934	1935	1936	1937
D. Industrial machinery:														
1. Metal-cutting machine tools	thousands	15.0	15.4	19.0	24.0	31.0	40.0	266.7	21.7	102.7	123.4	126.3	129.2	129.0
2. Water spinning frames for all fibres (reduced to a common basis)	units	—	333	830	2,000[1]	4,300[1]	6,500	—	—	—	249.2	241.0	215.0	151.2
3. Looms (reduced to a common basis)	"	444	2,130	5,657	12,000[1]	20,000[1]	32,000	—	—	479.7	265.6	212.1	166.7	160.0
E. Agricultural machinery:														
1. Harvester-combines	thousands	10.0	10.6	12.0	16.0	20.0	20.0	200.0	14.9	106.0	113.2	133 3	125.0	100.0
2. Tractor ploughs (with ploughshares, in terms of one-furrow ploughs)	"	180	235	300	450	460	470	261.1	21.1	130.6	128.1	149.5	102.2	102.2
F. Metal products for general consumption:														
1. Bicycles	"	128.0	140	320	390	470	575	447.8	35.0	109.0	228.6	121.9	120.5	122.3
2. Radio sets	"	29.3	30	150	250	350	500	—	—	102.4	500.0	166.7	140.0	142.9
3. Electric bulbs (all types)	millions	48.2	69	85	100	130	160	332.0	27.1	143.2	123.2	117.6	130.0	123.1
4. Watches and clocks	mill. rbls. (1932 prices)	20.8	24	30	45	70	100	480.8	36.9	115.4	125.0	150.0	155.6	142.9
5. Phonographs (total)	thousands	57.8	162.0	450.0	700.0	1,000.0	1,500.0	—	91.8	280.3	277.8	155.6	142.9	150.0
of which: P. C. of Heavy Industry	"	25.8	62.0	275.0	450.0	725.0	1,200.0	—	115.5	240.3	443.5	163.6	161.1	165.5
6. Phonograph records (P. C. of Heavy Industry)	millions	1.7	2.4	7.0	15.0	25.0	40.0	—	—	141.2	291.7	214.3	166.7	160.0
7. Metal products for general consumption (all categories under P. C. of Heavy Industry)	mill. rbls. (1932 prices)	392 6	510	900	1,050	1,225	1,430	364.2	29.5	129.9	176.5	116.7	116.7	116.7

VI. CHEMICAL INDUSTRY														
1. Phosphate fertilizers calculated in equivalents of 14% superphosphate	thous. tons	614	690	900	1,466	2,297	3,000	488.6	37.3	112.4	130.4	162.9	156.7	130.6
2. Powdered phosphorite (total) . of which:	"	396	430	535	850	1,370	2,200	555.6	40.9	108.6	124.4	158.9	161.2	160.6
P. C. of Heavy Industry (by industry of Union-wide importance)	"	339.7	337.0	455	650	950.0	1,500	441.6	34.6	99.2	135.0	142.9	146.2	157.9
Handicraft co-operative organizations	"	52	15	80	100	120	200	384.6	30.9	28.8	533.3	125.0	120.0	166.7
3. Rubber footwear	mill. prs.	64.8	61.6	65.0	75.0	85.0	100.0	154.3	9.1	95.0	105.5	115.4	113.3	117.6
4. Automobile tyres (total) . of which:	thousands	552.5	705	1,500	2,000	2,500	3,000	543.0	40.3	127.7	212.7	133.4	125.0	120.0
"Giant" type	"	179.7	290.0	500	700	900	1,000	556.5	40.9	161.3	172.4	140.0	128.6	111.1
Ordinary type	"	372.8	415.0	1,000	1,300	1,600	2,000	536.5	39.9	111.3	241.0	130.0	123.1	125.0
5. Plastic material soles (P. C. of Heavy Industry)	thous. tons	14.0	22.0	24.0	30.0	30.0	30.0	214.3	16.5	157.1	109.1	125.0	100.0	100.0
VII. BUILDING MATERIALS														
1. Cement	mill. bbls.	22.4	17.7	28.0	32.0	38.7	48.3	215.6	16.6	79.0	158.1	115.0	118.0	127.1
	thous. tons	3,481	2,749	4,350	5,000	6,000	7,500	215.6	16.6	79.0	158.1	115.0	120.0	125.0
2. Fire-clay (total) . of which:	"	793	890	1,228	1,781	1,996	2,300	290.0	23.7	112.2	138.0	145.0	112.1	115.2
P. C. of Heavy Industry (special plants) [2]	"	478	530	755	1,000	1,100	1,323	276.8	22.6	110.9	142.5	132.5	110.0	120.3
3. Dinas clay (total) . of which:	"	178	198	350	483	616	718	403.4	32.2	111.2	176.8	138.0	127.5	116.6
P. C. of Heavy Industry (special plants) [3]	"	109	116	220	311	388	450	412.8	32.8	106.4	189.7	141.4	124.8	116.0
4. Bricks (total) including unburnt [4] . of which:	millions	4,736	3,650	6,000	6,800	7,300	8,000	168.9	11.0	77.1	164.4	110.0	110.6	109.6
P. C. of Heavy Industry	"	2,142	1,714	2,560	2,860	3,225	3,575	166.9	10.8	80.0	149.4	111.7	112.8	110.9
Handicraft co-operative organizations	"	894	586	900	1,000	1,130	1,300	145.4	7.8	65.5	153.6	111.1	113.0	115.0

[1] The program is subject to revision.
[2] Inclusive of the Stalinogorsk and Krassnogorov Works.
[3] Inclusive of the Krassnogorov Works.
[4] Exclusive of the output of collective farm enterpris s.

Table 2—continued

Classification of output	Units of measurement	Absolute figures						Relative figures					
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year			
										1933	1934	1935	1936	1937
5. Tar-paper (total)	thous. rolls	3,474	3,900	4,700	6,075	6,200	6,600	190.0	13.7	112.3	120.5	129.3	102.1	106.5
of which:														
P. C. of Heavy Industry	..	3,094	3,400	4,000	4,900	5,000	5,200	168.1	10.9	109.9	117.6	122.5	102.0	104.0
6. Rubberoid	..	397	555	750	1,110	1,600	1,800	453.4	35.3	139.8	135.1	148.0	144.1	112.5
7. Tiles	millions	59	42	95	164	181	200	339.0	27.7	71.2	226.2	172.6	110.4	110.5
of which:														
P. C. of Heavy Industry	..	7.6	6	20	35	35	35	460.5	35.7	78.9	333.3	175.0	100.0	100.0
8. Asbestos	thous. tons	60	74	100	145	175	200	333.3	27.2	123.3	135.1	145.0	120.7	114.3
9. Lime (total)	..	2,986	2,060	2,800	3,500	4,000	4,850	162.4	10.4	69.0	135.9	125 0	117.1	118.3
of which:														
P. C. of Heavy Industry [1]	..	1,326	602	1,000	1,200	1,400	1,500	113.1	2.5	45.4	166.1	120.0	116.7	107.1
10. Plaster of Paris (total)	..	475	535	800	900	1,000	1,200	252.6	20.4	112.6	149.5	112.5	111.1	120.0
of which:														
P.C. of Heavy Industry [1]	..	252	270	400	455	490	530	210.3	16.1	107.1	148.1	113.7	107.7	108.2
VIII. TIMBER AND WOOD-WORKING INDUSTRY														
1. Hauling of merchant timber (total)	mill. m^3	99.4	98.8	118.5	131.4	148.9	170.0	171.0	11.3	99.3	119.9	110.8	113.3	114.1
of which:														
A. Principal purveyors	..	92.9	91.2	105.6	118.7	136.2	158.3	170.3	11.2	98.1	115.8	112.4	114.7	116.2
of which:														
P. C. of Timber	..	60.8	62.4	69.3	80.0	94.0	113.0	185.8	13.2	102.6	111.0	115.4	117.5	120.2
P. C of Heavy Industry (Timber Department)	..	9.9	8.0	10.1	10.4	10.8	10.8	109.0	1.7	80.8	126.3	103.0	103.8	100.0
P. C. of Transportation (Central Lumber Board)	..	11.9	11.2	12.7	13.8	15.3	17.0	142.9	7.4	94.1	113.3	108.7	110.9	111.1
All-Union Association of Timber Co-operative Organizations	..	4.0	4.7	6.2	7.0	7.8	9.0	225.0	17.6	117.5	131.9	112.9	111.4	115.4

B. Organizations procuring their own supplies	"	6.5	7.6	12.9	12.7	12.7	11.7	180.0	12.5	116.9	169.7	98.4	100.0	92.1
2. Fuel wood hauled (total)	"	65.3	77.0	98.5	99.7	102.1	107.0	163.9	10.4	117.9	127.9	101.2	102.4	105.0
of which:														
A. Principal organizations hauling fuel wood	"	55.5	56.6	65.7	69.7	74.8	83.2	149.9	8.4	101.9	116.0	106.0	107.3	111.2
of which:														
P. C. of Timber	"	29.3	29.3	34.7	38.0	42.0	48.0	163.8	10.4	100.0	118.4	109.5	110.5	114.2
P. C. of Heavy Industry (Timber Department)	"	4.8	3.8	4.9	5.0	5.2	5.2	108.3	1.6	79 1	128.9	102.0	104.0	100.0
P. C. of Transportation (Central Lumber Board)	"	5.7	5.2	6.3	6.7	7.2	8.0	140.4	7.0	91.2	121.0	106.3	107.5	111.1
All-Union Association of Timber Co-operative Organizations	"	3.0	4.7	4.3	4.0	4.2	4.5	150.0	8.5	156.6	91.4	93.0	105.0	107.1
B. Organizations procuring their own supplies	"	9.8	20.4	32.8	30.0	27.3	23.8	242.8	19.4	208.2	160.8	91.5	91.0	87.1
3. Saw-mill products (total)	"	24.41	22.57	25.72	30.30	35.82	43.00	176.2	12.0	92.5	114.0	117.8	118.2	120.0
of which:														
A. Principal producers of saw-mill products	"	21.56	19.87	22.22	26.30	31.07	37.25	172.8	11.6	92.2	111.8	118.4	118.1	119.9
of which:														
P C. of Timber	"	15.35	14.60	16.00	19.20	23.20	28.50	185.7	13.2	95.1	109.6	120.0	120.8	122.8
P. C. of Heavy Industry (Timber Department)	"	2.59	2.12	2.50	2.70	2.80	2.88	111.2	2.1	81.9	117.9	108.0	103.7	102.9
P. C. of Transportation (Central Lumber Board)	"	2.07	1.82	2.00	2.40	2.84	3.40	164.3	10.4	87.9	109.9	120.0	118.3	119.7
All-Union Association of Timber Co-operative Organizations	"	1.50	1.28	1.65	1.90	2.10	2.30	153.3	8.9	85.3	128.9	115.2	110.5	109.5
B. Organizations procuring their own supplies	"	2.85	2.70	3.50	4.00	4.75	5.75	201.8	15.1	34.7	129.6	114.3	118.8	121.1
4. Plywood (total)	thous. m³	423.0	425.5	489.0	537.0	614.0	735.0	173.8	11.7	100.6	114.9	109.8	114.3	119.7
of which:														
P. C. of Timber	"	365.4	379.0	428.5	475.0	550.0	670.0	183.4	12.9	103.7	113.1	110.9	115.8	121.8
P. C. of Light Industry	"	57.6	46.5	60.5	62.0	64.0	65.0	112.8	2.4	80.7	130.1	102.5	103.2	101.6

[1] Inclusive of the building industry.

Table 2—continued

Classification of output	Units of measurement	Absolute figures						Relative figures						
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	In % of preceding year				
										1933	1934	1935	1936	1937
IX. PAPER INDUSTRY														
1. Paper (total)	thous. tons	471.2	508.0	600.0	655.0	740.0	1,000.0	212.2	16.3	107.8	118.1	109.2	113.0	135.1
of which:														
P. C. of Timber	"	437.4	472.0	550.0	615.0	700.0	950.0	217.1	16.8	107.9	116.5	111.8	113.8	135.7
Of the total:														
a) Paper for writing and printing (P. C. of Timber)	"	277.2	298.0	340.0	386.0	440.0	585.0	211.0	16.1	107.5	114.1	113.5	114.0	132.9
b) Paper for industrial and other purposes	"	194.0	210.0	260.0	269.0	300.0	415.0	213.9	16.4	108.2	123.8	103.5	111.5	138.3
2. Board and fibre (total)	"	42.5	45.5	60.6	81.1	89.5	125.0	294.1	24.1	107.1	133.2	133.8	110.4	139.7
of which:														
P. C. of Timber	"	36.7	38.6	51.1	61.1	71.5	107.0	291.6	23.9	105.2	132.4	119.6	117.0	149.7
X. WOOD-CHEMICAL INDUSTRY (P. C. of Timber)														
1. Turpentine	"	36.3	31.0	40.0	51.0	58.0	67.0	184.6	13.1	85.4	129.0	127.5	113.7	115.5
2. Acetic acid	"	2.7	3.8	6.2	8.0	10.0	12.3	455.6	35.4	140.7	163.2	129.0	125.0	123.0
3. Rosin of various kinds	"	24.3	27.1	34.4	44.5	55.0	64.0	263.4	21.4	111.5	127.0	129.4	123.6	116.4
4. Wood briquettes	"	—	—	20.0	32.0	52.0	96.0	—	—	—	—	160.0	162.5	184.6
XI. LIGHT INDUSTRY														
1. Cotton fabrics, total (inclusive of unbleached materials) [1] . .	mill. m	2,719.7	2,816.3	3,059.2	3,475.0	4,215.0	5,100.0	187.5	13.4	103.6	108.6	113.6	121.3	121.0
of which:														
P. C. of Light Industry	"	2,596.4	2,693.2	2,927.1	3,345.0	4,045.0	4,900.0	188.7	13.5	103.7	108.7	114.3	120.9	121.1
2. Woollen fabrics	"	91.3	82.6	68.8	100.0	145.0	220.0	240.9	19.3	90.4	83.2	145.3	145.0	151.7
3. Linen fabrics	mill. m^2	130.0	135.0	192.0	260.0	390.0	600.0	461.5	35.8	103.8	142.2	135.4	150.0	153.8
4. Knit goods (P. C. of Light Industry):														
a) Underwear	mill. pcs.	16.3	18.8	30.3	50.0	70.0	100.0	613.5	43.7	115.3	161.2	165.0	140.0	142.8
b) Hosiery	mill. prs.	154.3	188.0	245.6	325.0	475.0	725.0	469.9	36.3	121.8	130.6	132.3	146.1	152.6

5. Leather footwear (total) . . .	"	82.0	75.5	67.5	86.0	128.0	180.0	219.5	17.1	92.0	89.4	127.4	148.8	140.6
of which:														
P. C. of Light Industry	"	73.2	67.5	62.0	80.0	120.0	170.0	232.2	18.4	92.2	91.8	129.0	150.0	141.6
6. Matches	mill. cases	5.6	7.0	10.0	10.5	11.1	12.0	214.3	16.5	125.0	142.9	105.0	105.7	108.1
7. Soap (in 40 % equivalents) . .	thous. tons	357.2	295.0	460.0	555.0	750.0	1,000.0	280.0	22.9	82.6	155.9	120.7	135.1	133.3
8. Window glass (total)	thous. m^2	22,300.0[1]	30,660.0	51,840.0	67,500.0	75,400.0	81,400.0	365.0	29.6	137.5	169.1	130.2	112.7	108.0
of which:														
P. C. of Light Industry	"	13,940.0	19,300.0	30,840.0	43,100.0	47,500.0	49,500.0	355.0	28.8	138.7	159.8	139.8	110.2	104.2
P. C. of Heavy Industry	"	8,360.0	9,860.0	19,100.0	22,500.0	26,000.0	30,000.0	358.8	29.1	117.9	193.7	117.8	115.6	115.4
9. Tea glasses	millions	85.3	80.0	143.1	149.5	214.5	340.0	398.6	31.9	93 8	178.9	104.5	143.5	158.5
10. Lamp glass	"	—	64.0	144.6	150.0	184.0	197.0	—	—	—	225.9	103.7	122.7	107.1
11. Porcelain and crockery (total)	thous. tons	83.6	74.5	99.5	110.0	135.0	180.0	215.3	16.6	89.1	133.6	110.5	122.7	133.3
of which:														
P. C. of Light Industry	"	63.7	56.2	78.5	85.0	110.0	150.0	235.5	18.7	102.0	120.8	108.3	129.4	136.4
12. Musical instruments: plucked (P. C. of Light Industry) . . .	thousands	490.8	470.0	603.0	775.0	1,100.0	1,320.0	268.9	21.9	95.8	128.3	128.5	141.9	120.0
13. Motion picture film (Chief Board of Motion Picture and Photography Industry)	mill. linear m	25.5	30.7	65.0	90.0	180.0	300.0	—	—	120.4	211.7	138.5	200.0	166.7
XII. FOOD INDUSTRY														
1. Meat (P. C. of Supply)	thous. tons	435.0	380.0	480.0	600.0	850.0	1,200.0	275.9	22.5	87.4	126.3	125.0	141.7	141.2
2. Fish (total catch)	"	1,333.0	1,300.0	1,500.0	1,550.0	1,660.0	1,800.0	135.0	6.2	97.5	115.4	103.3	107.1	108.4
3. Granulated sugar	"	828.2	1,100.0	1,400.0	1,650.0	2,000.0	2,500.0	302.0	24.7	132.8	127.3	117.9	121.2	125.0
4. Oleo-margarine and fat compounds	"	38.6	60.0	75.0	90.0	105.0	120.0	310.9	25.5	153.4	125.0	120.0	116.	114.3
5. Canned goods (P. C. of Supply)	mill. stand. cans	716.0	750.0	850.0	1,120.0	1,500.0	2,000.0	279.3	22.8	104.7	113.3	131.8	133.9	133.3

[1] In standard width of 1932.
[2] Exclusive of handicraft co-operative organizations.

Table 2—continued

Classification of output	Units of measurement	Absolute figures						Relative figures					
										in % of preceding year			
		1932	1933	1934	1935	1936	1937	1937 in % of 1932	Average annual rates of increase	1933	1934	1935	1936	1937
6. Butter	thous. tons	65.1	101.0	108.0	127.0	146.0	180.0	276.5	22.6	155.1	106.9	117.6	115.0	123.3
of which:														
P. C. of Supply	"	56.2	79.0	83.0	93.0	105.0	130.0	231.3	18.3	140.6	105.1	112.0	112.9	123.8
7. Cheese	"	12.5	14.5	15.0	20.5	27.0	37.0	296.0	24.2	116.0	103.4	136.7	131.7	137.0
of which:														
P. C. of Supply	"	11.1	12.5	13.0	17.0	22.0	30.0	270.3	22.0	112.6	104.0	130.8	129.4	136.4
8. Alcohol	thous. hl.	3,648.0	4,200.0	5,500.0	6,100.0	6,750.0	7,500.0	205.6	15.5	115.1	130.9	110.9	110.7	111.1
of which:														
a) P. C. of Supply	"	3,024.0	3,600.0	4,750.0	5,300.0	5,900.0	6,600.0	218.3	16.9	119.0	131.9	111.6	111.3	111.9
b) P. C. of Agriculture	"	624.0	600.0	750.0	800.0	850.0	900.0	144.2	7.6	96.2	125.0	106.7	106.3	105.9
9. Cigarettes	billions	67.4	70.0	73.0	85.0	100.0	125.0	185.5	13.2	103.9	104.3	116.4	117.6	125.0
10. Makhorka tobacco	thous. cases	3,274.1	2,700.0	3,200.0	4,000.0	5,000.0	6,000.0	183.3	12.9	82.5	118.5	125.0	125.0	120 0
11. Confectionery	thous. tons	548.0	479.0	615.0	780.0	980.0	1,350.0	246.3	19.8	87.4	128.4	126.8	125.6	137.8
of which:														
a) P. C. of Supply	"	462.1	400.0	500.0	620.0	800.0	1,100.0	238.0	19.0	86.6	125.0	124.0	129.0	137.5
b) Handicraft co-operative organizations	"	83.9	79.0	115.0	160.0	180.0	250.0	291.0	23.8	92.0	145.6	139.1	112.5	138.8
12. Beer	thous. hl.	4,206.0	4,472.0	4,645.0	5,150.0	6,300.0	7,500.0	178.3	12.4	106.3	103.9	110.9	122.3	119.0
13. Flour and cereal products (total)	thous. tons	38,757.0	45,000.0	48,000.0	51,000.0	53,500.0	55,350.0	142.8	7.4	116.1	106.7	106.3	104.9	103.5
of which:														
Produce Procurement Committee of the Council of P. C.'s (exclusive of All-Union Flour Milling and Cereal Products Trust)	"	8,165.5	9,025.0	11,420.0	12,600.0	13,250.0	14,000.0	171.5	11.4	110.5	126.5	110.3	105.2	105.7
14. Bread baking (All-Union Co-op. Ass'n.)	mill. tons	7.0	7.4	9.6	9.5	10.0	10.5	150.0	8.5	105.7	121.6	105.5	105.3	105.0
15. Tea (All-Union Co-op. Ass'n.)	thous. tons	13.0	11.9	11.15	25.0	45.0	70.0	538.5	40.0	91.5	93.7	224.2	180.0	155.6

Table 3

GROSS OUTPUT OF HANDICRAFT CO-OPERATIVE ORGANIZATIONS

(All-Union Council of Handicraft Co-operative Organizations, All-Union Association of Timber Co-operative Organizations, All-Union Council of Invalids' Co-operative Organizations)
(in million rubles, in prices of 1932)

Branches of industry	Absolute figures						In % of preceding year					1937 in % of 1932
	1932	1933	1934	1935	1936	1937	1933	1934	1935	1936	1937	
Fuel	43.0	40.7	53.6	56.0	59.0	62.0	94.7	131.7	104.5	105.4	105.1	144.2
Ore mining and fertilizer production	3.1	3.6	11.7	14.5	19.0	22.0	116.1	325.0	123.9	131.0	115.6	709.7
Building materials	185.8	112.0	162.0	195.0	230.0	278.0	60.3	144.6	120.4	117.9	120.8	149.6
Silicate products and pottery	70.3	79.4	112.5	140.0	175.0	220.0	112.9	141.7	124.4	125.0	125.7	312.9
Metal working	694.9	778.6	923.5	1,020.0	1,130.0	1,260.0	112.0	118.6	110.5	110.7	111.5	181.3
Chemical	260.8	284.0	345.0	405.0	476.0	560.0	108.9	121.5	117.4	117.5	117.6	214.7
Leather, footwear and fur	752.1	641.3	709.3	810.0	950.0	1,170.0	85.3	110.6	114.2	117.4	123.2	155.6
Timber cutting	144.0	156.5	178.0	201.0	224.0	251.0	108.7	113.7	112.9	111.4	111.9	174.3
Wood-working	668.6	652.2	803.5	905.0	1,080.0	1,320.0	97.5	123.2	112.6	119.3	122.2	197.4
Wood-chemical	93.0	113.0	136.3	153.0	176.0	204.0	121.5	120.6	112.3	115.0	115.2	219.4
Fulling and felt	86.8	76.0	89.6	110.0	137.0	175.0	87.6	117.9	122.7	124.5	127.7	201.6
Textile	293.9	225.4	271.5	330.0	409.0	510.0	76.7	120.5	121.5	123.9	124.7	173.5
Knit goods	216.5	231.0	274.0	325.0	395.0	485.0	106.7	118.6	118.6	121.5	122.8	224.0
Needle trades	690.7	652.0	800.0	925.0	1,080.0	1,280.0	94.4	122.7	115.6	116.8	118.5	185.3
Manufacture of articles for cultural purposes	182.8	207.2	283.5	340.0	410.0	500.0	113.3	136.8	119.9	120.6	121.9	273.5
Printing and paper	92.9	100.9	117.3	140.0	168.0	205.0	108.6	116.3	119.4	120.0	122.0	220.7
Fancy articles	224.7	239.0	300.5	370.0	460.0	580.0	106.4	125.7	123.1	124.3	126.1	258.1
Food products	979.1	1,040.9	1,348.0	1,656.0	2,046.0	2,473.0	106.3	129.5	122.8	123.6	120.8	252.6
Miscellaneous	13.0	14.8	18.2	22.0	27.0	35.0	113.8	123.0	120.0	122.7	129.5	269.2
Total commodity output	5,696.0	5,648.5	6,938.0	8,117.5	9,651.0	11,590.0	99.2	122.8	117.0	118.9	120.1	203.5

Table 3—continued

Branches of industry	Absolute figures						In % of preceding year					1937 in % of 1932
	1932	1933	1934	1935	1936	1937	1933	1934	1935	1936	1937	
Utilization of waste and scrap	132.6	115.0	160.0	200.0	250.0	325.0	86.7	139.1	125.0	125.0	130.0	245.1
Public catering	290.1	353.0	425.0	500.0	580.0	675.0	121.7	120.4	117.6	116.0	116.4	232.7
Miscellaneous non-commodity production	857.9	777.0	965.0	1,100.0	1,235.0	1,380.0	90.6	124.2	114.0	112.3	111.7	160.9
Total handicraft co-operative production	6,976.6	6,893.5	8,488.0	9,917.5	11,716.0	13,970.0	98.8	123.1	116.8	118.1	119.2	200.2
of which:												
All-Union Council of Handicraft Co-operative Organizations	5,318.1	5,221.0	6,434.4	7,547.5	8,898.0	10,570.0	98.2	123.2	117.3	117.9	118.8	198.7
All-Union Association of Timber Co-operative Organizations	851.3	855.8	1,038.5	1,168.0	1,373.0	1,650.0	100.5	121.3	112.4	117.6	120.2	193.8
All-Union Council of Invalids' Co-operative Organizations	807.2	816.7	1,015.1	1,202.0	1,445.0	1,750.0	101.2	124.3	118.4	120.2	121.1	216.8

IV. AGRIGULTURE

Table 1

GROSS OUTPUT OF AGRICULTURE, IN FIXED PRICES OF 1926-27
(in million rubles)

Indices	1932	1937	1937 in % of 1932	Structure in % of total	
				1932	1937
A. Field Cultivation					
I. Grain crops	3,701.2	5,872.4	158.7	28 3	22.5
Grains	3,460.9	5,506.1	159.1	26.5	
of which:					
Food	2,701.6	4,119.3	152.5	20.7	15.7
Forage	759.3	1,386.8	182.6	5.8	5.3
II. Industrial crops	1,091.5	2,381.9	218.2	8.3	9.1
a) Fibres	607.6	1,089.2	179.3	4.6	4.2
of which:					
Cotton	357.9	637.6	178.2	2.7	2.4
Flax	169.6	280.1	165.2	1.3	1.1
b) Oil-bearing crops	341.1	654.0	191.7	2.6	2.5
of which:					
Sunflower seed	174.0	297.2	170.8	1.3	1.1
New oil-bearing crops	38.9	132.1	339.6	0.3	0.5
Volatile oil and medicinal crops	22.4	50.7	226.3	0.2	0.2
c) Food crops	140.8	568.7	403.9	1.1	2.2
of which:					
Sugar beet	76.7	322.9	421.0	0.6	1.2
New crops	3.1	57.7	1,861.3	—	0.2
III. Vegetables, incl. potatoes	2,292.2	4,247.8	185 3	17.5	16.2
IV. Fruits, including grapes	386.8	753.6	194.8	3 0	2.9
V. Forage	1,994.5	4,085.0	204.8	15.3	15.6
VI. Seed production	64.0	263.0	410.9	0.5	1.0
VII. Uncompleted and misc. production	249.0	529.3	212.6	1.9	2.0
Total output	9,779.2	18,133.0	185.4	74.8	69.3
B. Stock-Raising					
I. Meat and fats	1,193.1	2,802.6	234.9	9.2	10.7
II. Milk	1,414.4	2,231.0	157.7	10.8	8.5
III. Hides	253.2	596.9	235.7	1.9	2.3
IV. Miscellaneous livestock products	324.1	1,472.1	454.2	2.5	5.6
Total, exclusive of natural increase of the herds	3,184.8	7,102.6	223.0	24.4	27.1
V. Natural increase of the herds	107.8	924.4	857.5	0.8	3.5
Total output of stock raising	3,292.6	8,027.0	243.8	25.2	30.7
Total in all branches of agriculture	13,071.8	26,160. 0	200.1	100.0	100.0

Table 2

GROSS OUTPUT OF PRINCIPAL CATEGORIES OF AGRICULTURAL PRODUCTS

(Physical volume in million centners)

Agricultural products	1932	1937	1937 in % of 1932
I. Grains (total) . .	698.7	1,048.0	150.0
of which:			
1. Wheat	202.5	378.4	186.9
2. Winter rye . . .	217.4	254.1	116.9
3. Barley	50.3	83.9	166.8
4. Oats	112.4	180.5	160.6
5. Corn and sorghum	34.9	60.65	173.8
6. Millet	43.3	23.0	53.1
7. Buckwheat . . .	9.2	14.0	152.2
8. Legumes	14.2	31.9	224.6
9. Rice	2.0	5.55	277.5
II. Industrial crops			
1. Unginned cotton .	12.7	21.25	167.3
2. Flax (fibre) . . .	5.0	8.0	160.0
3. Sugar beet . . .	65.6	276.0	420.7
4. Sunflower seed .	22.7	34.0	150.4
III. Stock-raising products			
1. Meat and fats (total exclusive of offal)	23.0	50.9	221.8
2. Milk	202 3	324.3	160.3
3. Wool	0.69	1.6	231.5
4. Eggs for consumption (billions) . .	4.2	12.25	291.7

Table 3

YIELD OF PRINCIPAL CROPS
(in centners per hectare)

Crops	Average yield over a number of years		Highest yield during 1922-32	1937	1937 in % of:		
					Average yield over a number of years		Highest yield during 1922-32
	1909-1913	1928-1932			1909-1913	1928-1932	
I. Grains							
All grains	7.4	7.5	8.5	10.0	135.1	133.3	117.8
Winter wheat	8.7	8.6	10.6	11.6	133.3	134.9	109.4
Rye	7.4	8.0	8.6	10.8	145.9	135.0	125.6
Spring wheat	6.2	6.1	8.0	8.0	129.0	131.1	100.0
Oats	7.9	8.3	9.7	10.5	132.9	126.5	108.2
Spring barley	8.5	8.2	9.4	10.4	122.4	126.8	110.6
Millet	7.0	5.6	6.5	7.3	104.3	130.4	112.3
Buckwheat	5.3	5.5	6.0	7.0	132.1	127.3	116.7
Corn	10.3	8.9	13.2	13.5	131.1	151.7	102.3
II. Industrial Crops							
Unginned cotton (in irrigated regions)	11.7	7.5	9.1	12.0	102.6	160.0	131.9
Long fibre flax (fibre)	3.6	2.26	2.6	3.7	102.8	163.7	142.3
Sugar beet (for industrial use)	155.0	120.1	158.0	200.0	129.1	166.6	126.6
Sunflower seed	7.5	5.5	6.4	8.5	113.4	154.6	132.9
Potatoes	—	78.1	86.0	110.0	—	140.9	127.8

Table 4

PLANTED SOWING AREAS FOR THE YEARS INDICATED, BY CROPS
(in thous. ha.)

Crops	1932	1937	1937 in % of 1932
Total area	134,435[1]	139,740	103.9
a) Winter crops	37,935	38,550	101.6
b) Spring crops	96,500	101,190	105.6
I. Grains	99,700	104,800	105.1
a) Winter crops	37,935	38,550	101.6
of which:			
Rye	25,775	23,600	91.6
Wheat	11,815	14,540	123.1
b) Spring crops	61,776	66,250	107.2
of which:			
Wheat	22,689	26,300	115.9
Oats	15,423	17,200	111.5
Barley	6,499	7,850	120.8
Millet	7,673	3,075	40.1
Buckwheat	1,662	2,000	120.3
Corn and sorghum	3,783	4,310	113.9
Legumes	2,128	3,575	168.0
Rice	122	270	221.3
II. Industrial crops	14,877	13,110	88.1
of which:			
1. Fibre crops	5,675	5,185	91.3
inclusive of:			
a) Cotton	2,172	2,040	93.9
b) Long-fibre flax	2,510	2,180	86.9
c) Hemp	944	895	94.8
2. Oil-bearing crops	7,168	5,995	83.6
of which:			
a) Sunflower seed	5,306	4,000	75.4
b) Linseed flax	645	500	77.5
c) Soya beans	300	350	116.7
3. Foodstuff and tobacco crops	1,909	1,750	91.7
of which:			
a) Sugar beet	1,634	1,450	88.7
b) Tobacco	99	110	111.1
c) Makhorka	148	130	87.8
III. Truck garden products and melons	9,215	9,570	103.9
of which:			
a) Potatoes	6,111	6,634	108.6
b) Other vegetables	2,236	2,226	99.6
IV. Forage	10,632	12,260	115.3
of which:			
a) Grasses	8,250	10,290	124.7
b) Silo products	1,656	1,050	63.4
c) Root crops	726	920	126.7

[1] Including 11,000 hectares not classified by crops.

Table 5

PLANTED SOWING AREAS FOR THE YEARS INDICATED, BY DISTRICTS

(in thousand hectares)

Republics, territories and regions	1932	1937	1937 in % of 1932
U.S.S.R.	134,435	139,740	103.9
I. R.S.F.S.R. (exclusive of Kirghizia and the Karakalpak A.S.S.R.)	96,650	100,880	104.4
of which, by districts:			
Northern Territory	1,094	1,448	132.3
Karelian A.S.S.R.	67	85	126.9
Leningrad Region	2,146	2,785	129 8
Moscow Region	5,894	6,548	111.1
Ivanovo Industrial Region	2,256	2,910	129.0
Gorky Territory	6,359	7,090	111.5
Western Region	4,869	5,300	108.9
Central Black Soil Region	11,018	11,110	100.8
Tatar A.S.S.R.	3,250	3,280	100.9
Middle Volga Territory	10,255	10,020	97.7
Saratov Territory	5,151	4,744	92.1
Stalingrad Territory	4,137	4,220	102.0
Azov-Black Sea Territory	8,526	7,990	93.7
Northern Caucasus Territory	4,135	4,105	99.3
Crimean A.S.S.R.	950	1,000	105.3
Sverdlovsk Region	2,680	2,800	104 5
Chelyabinsk Region	4,484	3,950	88.1
Ob-Irtysh Region	240	250	104.2
Bashkir A.S.S.R.	3 326	3,500	105.2
Kazak A.S.S.R.	5,610	5,350	95.4
West Siberian Territory	7,092	8,870	125.1
East Siberian Territory	2,092	2,235	106.8
Far Eastern Territory	951	1,190	125.1
Yakut A.S.S.R.	68	100	147.1
II. Ukrainian S.S.R.	26,438	27,000	102.1
III. White Russian S.S.R.	3,983	4,060	101.9
IV. Transcaucasian S.F.S.R.	2,585	2,550	98.6
V. Central Asia (as a whole)	4,779	5,250	109.9
VI. Uzbek S.S.R.	2,420	2,815	116.3
VII. Turkoman S.S.R.	426	480	112.7
VIII. Tajik S.S.R.	779	705	90.5
IX. Kirghiz A.S.S.R.	1,036	1,100	106.2
X. Karakalpak A.S.S.R.	118	150	127.1

Table 6

TRACTORS IN AGRICULTURE
(in thousand h.p.)

Years	Available at beginning of year	Supplied during the year	Discarded during the year	Available at end of year	Supplied by spring	Available by spring
1933	2,225	1,057	182	3,100	300	2,525
1934	3,100	1,600	300	4,400	500	3,600
1935	4,400	1,600	550	5,450	575	4,975
1936	5,450	2,050	825	6,675	650	6,100
1937	6,675	2,375	850	8,200	715	7,390

Table 7

DISTRIBUTION OF TRACTOR SHIPMENTS, BY ORGANIZATIONS
(in thousand h.p.)

Organizations	1933	1937	For the five years
P. C. of Agriculture . .	765.0	1,970.0	6,900.0
P. C. of State Farms .	230.0	285.0	1,350.0
Other agricultural consumers	62.0	120.0	432.0
Total	1,057.0	2,375.0	8,682.0

Table 8

DISTRIBUTION OF MOTOR VEHICLES, BY AGRICULTURAL ORGANIZATIONS

Indices	1933	1937	For the five years
P. C. of Agriculture:			
Trucks	8,050	38,700	105,250
Passenger cars	3,150	9,600	32,000
Miscellaneous	—	1,500	3,000
Total	11,200	49,800	140,250
P. C. of State Farms:			
Trucks	4,430	4,420	18,250
Passenger cars	1,920	2,080	10,000
Miscellaneous	—	500	1,500
Total	6,350	7,000	29,750
Total number of:			
Trucks	12,480	43,120	123,500
Passenger cars	5,070	11,680	42,000
Miscellaneous	—	2,000	4,500
Grand total	17,550	56,800	170,000

Table 9

DISTRIBUTION OF MOTOR VEHICLES, BY YEARS

Indices	1933	1934	1935	1936	1937	Total
Trucks	12,480	14,900	22,000	31,000	43,120	123,500
Passenger cars	5,070	6,000	8,500	10,750	11,680	42,000
Miscellaneous	—	—	1,000	1,500	2,000	4,500
Total	17,550	20,900	31,500	43,250	56,800	170,000

Table 10

AGRICULTURAL EQUIPMENT (INCLUDING TRACTORS) SUPPLIED TO AGRICULTURE

(in million rubles, in prices of 1932)

Equipment	1933	1934	1935	1936	1937	For the five years
Agricultural machinery and spare parts	315	390	465	509	520	2,190
Horse-drawn vehicles and miscellaneous equipment	50	80	89	97	105	421
Tractors and spare parts	375	595	600	720	835	3,125 [1]
Total	740	1,065	1,154	1,317	1,460	5,736

[1] The value of tractors is calculated in terms of cost of production of one tractor horse-power in 1932.

Table 11

FERTILIZERS SUPPLIED TO AGRICULTURE

(in thousand tons)

Kinds of fertilizer	1932	1937	1937 in % of 1932
Nitrates	22.2	1,410	6,351.3
Phosphates (14% superphosphate equivalent)	614.0	3,000	488.6
Sylvanite (15%)	79.0	1,680	2,126.6
Powdered phosphorite	396.0	2,200	555.5

Table 12

FERTILIZED AREA UNDER PRINCIPAL CROPS
(in thousand ha.)

Crops	Years	Total sowing area	Fertilized area		
			Nitrates	Phosphate solution	Potash
Cotton [1]	1932	2,172/1,670	100	100	—
	1937	2,040/1,676	1,341	1,341	350
Long-fibre flax	1932	2,510	—	180	—
	1937	2,180	600	plan 1,800	1,220
Hemp	1932	944	2	50	—
	1937	895	300	plan 350	350
Sugar beet	1932	1,634	—	1,229	—
	1937	1,450	580	1,450	580

[1] The denominator indicates irrigated cotton.

Table 13

YIELD-INCREASE MEASURES
(Area affected by each measure, in % of total)

Measures	Grains		Sugar beet		Cotton		Long-fibre flax	
					In irrigated districts			
	1932	1937	1932	1937	1932	1937	1932	1937
Sowing with pure-bred seed	27.5	75.0	80.0	100.0	—	100.0[1]	1.0	75.0
Improved methods of cultivation	20.0	60.0	40.0	100.0	30.0	80.0	20.0	90.0
Late autumn ploughing and fallow land under spring crops	41.0	60.0	66.0	100.0	20.0	60.0	20.0	100.0
Improved predecessors in crop rotation	10.0	50.0	20.0	90.0	2.4	13.4	20.0	65.0
Fertilizers (animal and mineral)	9.0	24.0[2]	55.0	100.0[3]	7.0	80.0	2.0	73.4[3]

[1] Replacement of old grades by new grades of greater yield and longer fibres.
[2] Manure and powdered phosphorite for winter crops.
[3] Treated with phosphoric fertilizers.

Table 14

NUMBERS OF DRAFT AND PRODUCTIVE ANIMALS, BY SECTORS AND YEARS OF THE SECOND FIVE-YEAR PLAN PERIOD
(in millions, as of the spring of year indicated)

Classification of farm animals	1932	1933	1937	1937 in % of	
				1932	1933
Horses (total)	19.6	16.6	21.8	111.2	131.3
of which:					
State farms and co-operative farms	0.89	0.83	1.1	122.2	132.3
Cattle (total)	40.7	38.6	65.5	160.9	169.7
of which:					
State farms and co-operative farms	3.5	3.8	6.7	191.4	176.3
Collective stock farms	6.1	5.6	9.2	150.8	164.3
Cows (total)	21.0	19.7	26.9	128.1	136.5
of which:					
State farms and co-operative farms	1.7	1.7	2 5	147.1	147.1
Collective stock farms	2.1	2.1	4.2	200.0	200.0
Hogs (total)	11.6	12.2	43.4	374.1	355.7
of which:					
State farms and co-operative farms	1.9	2.6	6.4	336.8	246.2
Collective stock farms	2.5	2.2	9.6	384.0	436.4
Sheep and goats (total)	52.1	50.6	96.0	184.3	189.7
of which:					
State farms and co-operative farms	7.2	7.7	14.9	206.9	193.5
Collective stock farms	4.5	7.1	27.6	613.3	388.7
Poultry: [1]					
State farms and co-operative farms	1.3	1.5	4.0	307.7	266.7
Collective stock farms	3.6	3.2	13.0	361.1	406.3
Doe rabbits: [1]					
State farms and co-operative farms	1.7	1.2	2.2	129.4	183.3
Collective stock farms	1.0	1.4	3.0	300.0	214.3

[1] Number given as of end of year.

Table 15

NUMBERS OF DRAFT AND PRODUCTIVE ANIMALS, BY SECTORS AND YEARS OF THE SECOND FIVE-YEAR PLAN PERIOD
(in millions, as of the spring of year indicated)

Classification of farm animals	1932	1933	1934	1935	1936	1937	1937 in % of	
							1932	1933
Horses	19.6	16.6	17.0	18 3	20.1	21.8	111.2	131.3
Cattle	40.7	38.6	44.3	50.3	57.1	65.5	160.9	169.7
Cows	21.0	19.7	21.0	22.7	24.7	26.9	128.1	136.5
Hogs	11.6	12.2	18.1	25.2	36.3	43.4	374.1	355.7
Sheep and goats	52.1	50.6	54.8	66.3	79.5	96.0	184.3	189.7
Poultry [1]	120.0	124.5	152.0	200.0	250.0	300.0	250.0	240.9
Doe rabbits [1]	5.3	7.0	12.0	14.2	15.7	17.0	320.8	242.9

[1] Number given as of end of year.

Table 16

QUALITATIVE INDICES IN STOCK-RAISING

Indices	Units of measurement	1932	1937	1937 in % of 1932
1. Average milk yield per cow:				
a) State milk farms in the R.S.F.S.R.	kg.	983.0	2,100 0	213.6
b) State butter farms	"	827.0	1,700.0	205.5
c) Collective stock farms	"	800.0	1,500.0	187.6
2. Average weight on hoof per head of cattle:				
a) State beef cattle farms	"	220.0	300.0	136.4
b) Collective stock farms	"	155.0	220.0	141.9
3. Average weight on hoof for hogs:				
a) State hog farms of the P. C. of State Farms	"	65.1	106.5	163.6
b) Collective stock farms	"	56.0	90.0	160.7
4. Milking by electricity	thous. head	0.4	575.0	—
5. Mechanized sheep shearing	" "	—	7,850.0	—

V. TRANSPORTATION AND COMMUNICATION

SUMMARY TABLE OF FREIGHT AND PASSENGER TRAFFIC

Table 1

Indices	1932	1933	1934	1935	1936	1937	In % of preceding year					1937 in % of 1932
							1933	1934	1935	1936	1937	
I. Freight traffic (million tons)												
1. Railway transportation	267.9	271.0	352.0	360.0	414.0	475.0	101.2	129.9	102.3[1]	115.0	114.7	177.3
2. River transportation (by tug boat)	46.9	45.8	59.0	62.0	74.5	90.0	96.7	128.8	105.1[1]	120.1	120.8	191.9
3. Maritime shipping (in Soviet bottoms)	14.8	16.2	24.6	27.5	32.5	40.0	109.5	151.9	111.8	118.2	123.1	269.9
4. Motor transportation	113.0	183.0	310.0	528.6	764.0	1,150.0	161.9	169.4	170.5	144.5	150.5	—
II. Passenger traffic (mill. passengers)												
1. Railway transportation	966.6	952.7	987.9	1,066.2	1,178.3	1,309.5	98.6	103.7	107.9	110.5	111.1	135.5
2. River transportation	43.6	37.0	45.0	50.0	60.0	74.0	84.9	121.6	111.1	120.0	123.3	169.7
3. Maritime shipping (in Soviet bottoms)	3.7	2.7	3.1	3.6	4.4	5.6	73.0	114.8	116.1	122.2	127.3	152.5
III. Freight traffic (billion ton-km.)												
1. Railway transportation	169.3	171.0	215.0	223.2	257.9	300.0	101.0	125.7	103.8	115.5	116.8	177.2
2. River transportation (by tug boat)	26.1	26.8	35.5	39.0	49.0	63.0	102.7	132.5	109.9	125.6	128.6	241.4
3. Maritime shipping (in Soviet bottoms)	18.2	21.7	30.6	34.0	41.0	51.0	119.2	141.1	111.1	120.6	124.4	280.2
4. Motor transportation	1.07	1.8	3.6	6.1	9.5	16.0	171.0	196.7	169.4	155.7	168.4	—
IV. Passenger traffic (billion passenger-km.)												
1. Railway transportation	83.7	78.2	82.0	88.5	97.8	110.0	93.4	104.9	107.9	110.5	112.5	131.4
2. River transportation	4.5	3.9	4.7	5.1	6.1	7.4	86.7	120.5	108.5	119.6	121.3	164.4
3. Maritime shipping (in Soviet bottoms)	1.0	0.8	0.9	1.0	1.15	1.4	80.0	112.5	111.1	115.0	121.7	140.0
V. Modes of Transportation, in % of total number of ton-km.												
1. Railway transportation	78.9	77.4	75.5	73.8	72.1	69.8	—	—	—	—	—	—
2. River transportation (by tug boat)	12.2	12.0	12.5	12.9	13.7	14.6	—	—	—	—	—	—
3. Maritime shipping (in Soviet bottoms)	8.4	9.8	10.7	11.3	11.5	11.9	—	—	—	—	—	—
4. Motor transportation	0.5	0.8	1.3	2.0	2.7	3.7	—	—	—	—	—	—

[1] If the totals for the first half-year as well as the expected totals for the whole of 1934 are taken into consideration, the increase in the freight traffic of 1935 as against 1934 will be considerably greater.

Table 2

INDICES OF RECONSTRUCTION OF RAILROAD TRANSPORTATION [1]

Indices	1932	1937
1. Length of electrified railroad lines (trunk and suburban lines, in km.)	50	5,050
Ratio of electrified railroad lines to total railroad lines in operation (%)	0.06	5.37
2. Number of freight cars equipped with automatic couplings, in thousand sets	—	322.5
Ratio of cars equipped with automatic couplings to the total actual number of cars (%)	—	50.0
3. Number of freight cars equipped with automatic brakes (%) [2]	11.0	100.0
4. Total length of lines equipped with automatic block signals (in km.)	582	8,882
In % of railroad line in operation	0.71	9.0
5. Total length of lines equipped with semi-automatic block signals (1,000 km.)	13.4	20.0
6. Number of switches operated from electric switch-towers (thousands)	1.4	6.4
7. Number of switches operated by mechanical switch-towers (thousands)	14.0	18.0
8. Length of lines covered by central despatcher service (km.)	—	180.0
9. Number of mechanized freight-yard humps (units)	—	6.0

[1] As of January 1, 1933 and January 1, 1938.

[2] In 1937, 60 per cent of the cars will be equipped with automatic brakes and the rest with air-line tubes.

Table 3

RAILROAD SHIPMENTS CLASSIFIED ACCORDING TO CATEGORY OF FREIGHT
(in million tons)

Indices	1932	1937	1937 in % of 1932
Total freight turnover	267.9	475.0	177.3
of which:			
Coal	56.7	125.0	220.5
Oil products	17.0	32.0	188.2
Fuel wood	13.9	19.0	136.7
Iron and steel	9.5	23.0	242.1
Ore	12.7	27.0	212 6
Timber	32.4	45.0	138.9
Mineral building materials .	24 6	40.0	162.6
Grain	23.8	32.0	134.5
Miscellaneous	77.3	132.0	170.8

Table 4

SUMMARY PLAN OF NEW RAILROAD CONSTRUCTION
(in km.)

Years	Commencement of construction	Development of construction	Opened for service [1]
Before January 1, 1933 . .	6,736	—	—
1937	1,213	7,802	4,348
Total for the five years . .	7,718	14,454 [2]	11 000
After January 1, 1938 . . .	—	—	3,454

[1] This computation of new railroad lines to be opened for operation includes only those to be put into permanent operation.

As of January 1,1933 there were 1,497 km. in temporary operation. The total length of the railroad system in permanent exploitation as of January 1, 1933 was 81,800 km.; including the lines in temporary operation the total was 83,300 km.

The total length in service on January 1, 1938 will be 92,900 km.; inclusive of lines in temporary operation, the total will be 94,000 km.

[2] Total length of lines begun prior to January 1, 1933, and during the period of the Second Five-Year Plan.

Table 5

FREIGHT AND PASSENGER WATERWAY TRANSPORTATION

Indices	1932	1937	1937 in % of 1932
River Transportation			
Total cargo by tug (thous. tons)	46,938	90,000	191.9
of which:			
a) Grain	2,564	6,380	248.8
b) Mineral bldg. materials	5,108	9,515	186.3
c) Coal	584	3,505	600.1
d) Salt	778	1,300	167.1
e) Timber (by boat)	6,691	11,850	177.5
f) Misc. dry cargoes	4,157	9,015	216.9
Total weight of dry cargoes	19,882	41,565	209.0
g) Timber rafts (by tug)	19,619	30,840	157.2
h) Oil cargoes	7,437	17,595	236.6
Passengers (thousands)	43,631	74,000	169.6
Maritime Transportation			
Cargo carried in Soviet bottoms (thousand tons)	14,820	40,000	269.9
of which:			
a) Oil cargoes	9,760	24,500	251.0
b) Dry cargoes	5,060	15,500	306.3
Passengers (thousands)	3,670	5,600	152.5

Table 6

MAIN INDICES OF WATERWAY TRANSPORTATION

Indices	1932	1937	1937 in % of 1932
I. Waterways			
Total length of navigated routes in use (thousand km.)	84.0	101.0	120.2
Total length of equipped riverways (thousand km.)	68.2	101.0	148.0
of which:			
Length of lighted riverways (thousand km.)	47.3	79.7	168.5
Length of dredged riverways (thousand km.)	27.1	41.2	152.2
II. River Fleet [1]			
Cargo-passenger vessels (thousand indicated h. p.)	188.0	260.0	138.3
Tug boats (thousand indicated h. p.)	322.0	500.0	155.3
Propelled oil tankers (thousand tons of cargo capacity)	1,508.0	2,850.0	189.0
Propelled dry cargo vessels (thousand tons of cargo capacity)	3,730.0	4,900.0	131.4
III. Maritime Fleet [1]			
Mercantile fleet (thousand tons of cargo capacity)	777.0	1,353.0	174.1

[1] 1937, in average navigation units.

Table 7

AIRWAY TRANSPORTATION [1]

Classification	1932	1937
Transportation of passengers (thousands)	27.2	665.0
Mail (tons)	429.7	68,500.0
Freight (tons)	447.2	26,500.0
Total transportation (million ton-km.)	1.6	120.0

[1] Exclusive of Deutsch-Russische Luftfahrt-Gesellschaft (Deruluft).

Table 8

EXPANSION OF MOTOR VEHICLE FLEET

Types of motor vehicles	As of Jan. 1, 1933	As of Jan. 1, 1934	As of Jan. 1, 1935	As of Jan. 1, 1936	As of Jan. 1, 1937	As of Jan. 1, 1938
Passenger cars	13,782	22,600	37,500	57,000	91,000	147,000
"GAZ AA" trucks	27,500	40,000	67,000	110,000	156,000	214,000
"ZIS 3-5" trucks	16,500	34,500	51,000	76,000	104,000	145,000
"YG 3-5" trucks	2,160	3,950	6,100	8,200	9,500	13,000
Other makes of trucks (including "AMO-F-15," Büssing, "SPA") . . .	8,440	7,350	6,900	4,800	2,500	1,000
Total number of trucks .	54,600	85,800	131,000	199,000	272,000	373,000
Busses	2,646	3,600	5,000	9,500	19,500	35,000
Vehicles for special purposes (including municipal and ambulance service)	4,372	5,800	6,500	9,500	15,500	25,000
Total of motor vehicles .	75,400	117,800	180,000	275,000	398,000	580,000
Production of motor vehicles (by years) . . .	49,500	72,000	110,000	140,000	200,000	—

Table 9

MAIN INDICES OF DEVELOPMENT IN COMMUNICATION
(as of end of year)

Indices	Units of measurement	1932	1937	1937 in % of 1932
A. VOLUME OF NATIONAL COMMUNICATION (OUTGOING, PAID)	million statistical units	9,800	20,500	209.2
1. Letters and postcards	millions	1,505	3,000	199.3
2. Newspapers and periodicals	„	4,694	9,000	191.7
3. Outgoing telegrams	„	76	140	184.2
4. Inter-urban telephone calls (exlusive of intra-district calls)	„	24	85	354.2
5. Urban telephone subscribers	thousands	415.6	820.0	197.3
B. NETWORK OF NATIONAL COMMUNICATION				
I. Post Office Department				
1. Number of post office stations	units	44,613	70,500	160.4
2. Number of rural letter carriers	persons	103,131	130,000	126.1
3. Length of mail routes:				
a) Mail car routes	thous. km.	101.0	122 2	121.0
b) Waterways	„	127.1	235.5	185.3
c) Airway lines	„	34.7	120.0	345.8
d) Automobile postal routes	„	24.8	400.0	—
e) Postal routes served by horse-drawn vehicles	„	740.0	622.0	84.1
4. Percentage of post roads served by mechanized vehicles	%	28.0	58.5	—
5. Transportation:				
Number of motor vehicles	units	907	10,160	—
Number of mail cars	„	1,341	1,650	123.0
Number of mail boats	„	80	141	176.3
II. Electrical Communication				
A. Inter-urban telegraph and telephone messages				
1. Total length of wires, including local communication . of which:	thous. km.	1,515	3,830	252.8
a) Bronze and bi-metallic	„	70.2	230	327.6
b) Iron and steel	„	1,444.8	3,600	249.2
2. Total length of cables	km.	1,981	6,074	306.6
3. Total length of cable conductors	thous. km.	17	485	—
4. High frequency multiplex instruments of operating half sets	units	64	380	593.8
5. Photo-telegraphic installations	„	4	39	975.0
6. Number of telegraph apparatuses in operation	„	9,995	15,460	154.6

Table 9—continued

Indices	Units of measurement	1932	1937	1937 in % of 1932
B. Urban telephone exchanges				
Installed capacity	thous. subscribers' lines	492.6	970.0	196.9
of which:				
a) Dial	„	77.6	500.0	644.4
b) Central battery	„	240	290.0	120.8
c) Local battery	„	175	180.0	102.8
C. Rural wire communication				
1. Provided with phone service:				
Rural Soviets	%	38.8	100.0	—
Machine and tractor stations:				
a) Outside connection	units	1,528	6,000	392.7
b) Inside connection	„	110	2,400	—
2. Number of telephones for rural service	thousands	44.0	254.4	578.2
C. RADIO COMMUNICATION				
1. No. of telegraph and telephone transmitters	units	73	294	402.7
2. Total capacity of same	kw.	933	3,411	365.6
3. No. of broadcasting stations	units	57	88	154.4
4. Total capacity of same	kw.	1,503	2,194	145.9
5. Local radio communication:				
a) No. of short-wave transmitters	units	354	1,730	488.7
b) No. of ultra-short-wave transmitters	„	—	5,500	—
D. COMMUNICATION IN RAILROAD TRANSPORTATION				
1. Total length of telephone and telegraph circuits	thous. km.	161.3	280.0	173.5
of which:				
Bronze and bi-metallic	„	10.0	36.0	360.0
2. No. of radio telegraph and telephone transmitters	units	67	120	179.1
3. Installed capacity of telephone exchanges	thous. subscribers'lines	88.9	141.0	158.4
of which:				
Dial system	„	2.0	22.0	—
E. COMMUNICATION IN THE WATERWAY TRANSPORTATION SYSTEM				
1. Total length of telephone and telegraph circuits	thous. km.	21.4	66.4	310.3
2. Installed capacity of telephone exchanges	thous. subscribers'lines	13.0	35.2	270.8
3. Number of radio telegraph and telephone transmitters	units	821	1,526	185.9
of which:				
On vessels	„	614	1,134	184.7

VI. TECHNICAL PRODUCTION INDICES

INDICES OF THE PLAN OF ELECTRIFICATION

Table 1

Indices	1932	1937
1. Regional stations, in % of total installed capacity of all stations in the Soviet Union	64.0	72.4
2. Stations with a capacity of 100,000 kw. and over, in % of total installed capacity of all regional stations in the Soviet Union	49.9	57.2
3. Regional stations, in % of total power output in the Soviet Union	68.6	78.3
4. Stations with a capacity of 100,000 kw. and over, in % of total output of regional stations	46.2	59.1
5. Capacity of regional stations, in % of total		
a) Heat-and-power stations	7.18	24.1
b) Hydro-electric stations	13.2	18.3
6. Production cost per kwh. delivered to the consumer by the power stations under the Chief Power Board of the P. C. of Heavy Industry (in kopeks)	5.99	4.25
7. Annual use factor of the average annual installed capacity of all stations in the Soviet Union (hours)	3,100	3,800
of which:		
Regional stations	3,460	4,200
8. Consumption of conventional fuel per kwh. generated in stations under the Chief Power Board of the P. C. of Heavy Industry (kg.)	0.77	0.60[1]
9. Consumption of conventional fuel per kwh. delivered to bus bars in the stations under the Chief Power Board of the P. C. of Heavy Industry (kg.)	0.84	0.66[1]
10. Consumption of conventional fuel per mega-calorie delivered to the consumer (kg.)	216	185
11. Power expenditure for station requirements of stations under the Chief Power Board of the P. C. of Heavy Industry (%)	7.5	7.3
12. Overall efficiency of stations under the Chief Power Board of the P. C. of Heavy Industry (%)	27.8	27.5

[1] The fuel consumption for waste steam is charged entirely to heat-and-power development.

FUEL

Table 2

Indices	1932	1937	1937 in % of 1932
COAL			
1. Percentage of mechanization in coal mining:			
a) Cutting	65.4	93.0	—
b) Gathering	76.5	90	—
c) Haulage	15	80	—
d) Loading	—	20	—
e) Mechanization of surface operations	26	60	—
2. Output (average for the U. S. S. R.) per worker per month (tons)	13.79	26.3	190.7
3. Ash content in coking coal (%):			
a) Donetz Basin	11.31	8.5	—
b) Kuznetsk Basin	9.42	7.5	—
c) Karaganda	17.4	12.5	—
4. Sulphur content of coking coal (%):			
a) Donetz Basin	2.59	1.6	—
b) Kuznetsk Basin	0.5	0.4	—
c) Karaganda	0.7	0.7	—
OIL			
1. Drilling speed per drilling machine in metres per month (average for all methods)	108.3	300.0	277.0
2. Percentage of total drilling represented by turbine drilling	2.6	12.0	—
3. Share in the total extraction (%) represented by:			
a) Gushers	24.3	27.0	—
b) Compressors and gas lift	51.3	44.0	—
c) Deep pumping	22.3	29.0	—
d) Other methods	2.1	—	—
4. Quantity of oil yield per worker engaged in oil extraction (tons per annum)	1,500	2,000	133.3
5. Oil refining:			
a) Amount of crude oil cracked (% of the total quantity refined)	14.1	35.0	—
b) Output of cracking gasoline in % of the crude oil cracked	20.4	25.0	—
c) Amount of gasoline and ligroine fractions (% of the total quantity of oil refined)	14.2	21.6	—
PEAT			
1. Extraction of peat by mechanized method (% of the total quantity extracted)	49.7	71.7	—
of which:			
a) Milled peat	27.5	40.4	—
b) Peat extracted by hydraulic method	21.9	27.0	—
c) Peat extracted by excavator method	0.3	4.3	—
2. Mechanization of preliminary operations (%)	22	80	—
3. Mechanization of peat drying (%)	16	65	—
4. Average labour productivity per worker (tons per year)	86.1	131.2	152.4

Table 3

IRON AND STEEL INDUSTRY

A. COEFFICIENTS OF EFFECTIVE UTILIZATION OF EQUIPMENT IN BLAST AND OPEN-HEARTH FURNACE DEPARTMENTS

Indices	1932	1937
Coefficient of Volumetric Efficiency of Blast Furnaces (per heat period)		
Average for the U.S.S.R.	1.75	1.20
1. Old Southern furnaces		
a) Using Krivoy Rog ore (average for the South)	1.56	1.20
b) Using Kerch ore (Voikov Works)	2.13	1.50
2. Old Eastern furnaces (charcoal and coal)	2.34	1.57
3. New large furnaces [1]		
a) Using Krivoy Rog ore	1.40	1.00
b) Using Kerch ore (Azov Steel Plant) [2]	—	1.45
c) Magnitogorsk Plant	1.77	1.00
Production Rate of Steel per Square Metre of Hearth Area of Open-Hearth Furnaces, (per heat period)		
1. Steel Association [3]	2.97	4.12
2. Steel Pipe Assn. } In furnaces of average capacity	3.13	4.02
3. Eastern Steel Assn. } In furnaces of average capacity	2.37	3.65
4. New furnaces of large capacity (hearth area of 57-66.5 m²) [3]	—	4.50

[1] The coefficients for 1937 refer to new furnaces working for more than a year.

[2] In 1935 the Azov Steel Plant begins to use Kerch ore in part; until then it is using Krivoy Rog ore.

[3] The number of days in blast for the new large furnaces has been taken as 310, for the remaining furnaces—300-310.

Table 4

IRON AND STEEL INDUSTRY

B. COEFFICIENTS OF CONSUMPTION OF RAW MATERIALS AND FUEL

Departments	1932	1937
	in tons	
BLAST FURNACE DEPARTMENTS		
Consumption of Iron Ore per Ton of Decarbonized Pig Iron		
1. Plants in the South using Krivoy Rog ore and agglomerate	1.812	1.720
2. Plants in the Urals (exclusive of Magnitogorsk)	1.862	1.900
3. Magnitogorsk Plant	1.770	1.700
4. Kuznetsk Plant	1.831	1.750
Consumption of Coke per Ton of Decarbonized Pig Iron		
1. Plants in the South using Krivoy Rog ore and agglomerate	1.162	0.950
2. Old plants in the Urals	1.498	1.100
3. New plants in the East	0.962	0.850
OPEN HEARTH DEPARTMENTS		
Consumption of Fresh Pig Iron per Ton of Open-Hearth Steel		
1. Open-hearth furnaces using molten pig iron	0.760	0.800
2. Open-hearth furnaces using solid pig iron	—	0.480
Consumption of Conventional Fuel per Ton of Open-Hearth Steel		
1. New open-hearth furnaces in the South and East	—	0.160
2. Old open-hearth furnaces in the South	0.341	0.232
3. Old open-hearth furnaces in the East	0.340	0.280

Table 5

BLAST FURNACES GROUPED ACCORDING TO USEFUL CAPACITY

Useful capacity	South		East		Central Area		Total	
	Jan. 1, 1933	Jan. 1, 1938	Jan. 1, 1933	Jan. 1, 1938	Jan. 1, 1933	Jan. 1, 1938	Jan. 1, 1933	Jan. 1, 1938
1. Up to 100 cu. m.	—	—	5	6	6	6	11	12
2. 101 to 500 „ „	26	21	38	35	3	3	67	59
3. 501 to 900 „ „	17	20	2	2	3	3	22	25
4. Standard capacity of 930 cu. m.	1	15	—	5	—	4	1	24
5. 1000 cu. m. and over	—	5	2	14	—	—	2	19
Total	44	61	47	62	12	16	103	139

Table 6

NON-FERROUS METALS

Main indices	1932	1937
COPPER		
1. Average copper content in ore (%)	3.73	1.8
of which:		
In ores for concentration	1.96	1.5
2. Average copper content in copper concentrates (for the entire copper industry) in %	12.0	18.0
of which:		
Ural Plant	12.0	14.0
Balkhash Plant	—	20.0
3. Extraction of copper by ore-dressing into concentrates (%)	78.0	85.0
4. Daily smelt per sq. metre		
a) Of section area in tuyere zone of water jacket furnaces (tons)	28.5	47.0
b) Of hearth area of reverberatory furnace (non-roasted concentrates, tons)	1.2	2.0
c) Of hearth area of reverberatory furnace (roasted concentrates, tons)	—	2.75
5 Smelting extraction (exclusive of converter process) in %		
a) In water jacket furnace	73.0	83.0
b) In reverberatory furnace	70.0	95.0
6. Percentage of total copper extracted in reverberatory furnaces	36.1	81.2
ZINC		
1. Average zinc content in ores (%)	8.2	8.0
2. Average zinc content in zinc concentrates	45.0	48.0
of which:		
In the Urals	40.0	40.0
3. Extraction of zinc by ore-dressing into zinc concentrates (%)	75.0	85.0
of which:		
In the Urals	35.0	70.0
4. Smelting extraction (%)		
a) In distillation plants (with dust chambers)	65.0	83.0
b) In electrolytic plants	—	85.0-90.0
5. Percentage of electrolytic zinc	—	70.0
LEAD		
1. Average lead content in ores (%)	6.5	6.0
of which:		
In the Ridder Plant	4.82	4.0
2. Average lead content in lead concentrates (%)	50.0	58.0
of which:		
a) Altai Plant	39.0	48.0
b) Sikhote-Ali Plant	70.0	78.0
3. Extraction of lead by ore-dressing into lead concentrates (%)	76.5	80.0
4. Smelting extraction of lead, with dust chambers and slag converters (%)	80.0	94.0

Table 7

CHEMICAL INDUSTRY

Classification of products	1932		1937	
	Absolute figures	Percentage of total	Absolute figures	Percentage of total
I. SULPHURIC ACID				
Utilization of Machine Aggregates				
Extraction of sulphuric acid in monohydrate per cu. m. of lead space, in kg:				
a) By the chamber process	6.5	—	7.0	—
b) By the tower process	16.5	—	25.6	—
Consumption of Raw Materials				
a) Ordinary pyrites	—	69.7	—	14.4
b) Flotation tailings	—	19.8	—	46.3
c) Carbonaceous pyrites	—	6.6	—	16.2
d) Waste gases of copper smelting plants (calculated in 45 % pyrites equivalent)	—	3.9	—	23.1
Total	—	100.0	—	100.0
II. PHOSPHATE FERTILIZERS				
Classified output (in P_2O_5 equivalent):				
a) Superphosphate	—	100.0	—	65.1
b) Dibasic superphosphate	—	—	—	4.0
c) Precipitate	—	—	—	12.8
d) Ammonium phosphate	—	—	—	14.3
e) Thermophosphate	—	—	—	3.8
Total	—	100.0	—	100.0
III. COKE-CHEMICAL INDUSTRY				
Coal tar extracted in coking (% of coal fed in)	—	1.4	—	2.4

Table 8

TIMBER INDUSTRY

(People's Commissariat of Timber)

Indices	1932	1937	1937 in % of 1932
I. Timber Cut			
Percentage of mechanization:			
a) In logging	1.0	16.4	—
b) In stripping	20.0	62.7	—
II. Hauling			
1. Percentage of hauling by mechanized traction	4.4	28.3	—
2. Percentage of hauling over rationalized roads (narrow-gauge railroads, ice roads for horses and other)	16.9	34.6	—
III. Timber-Sawing Industry			
1. Consumption of wood per cu. metre of saw-mill products (cu. metres)	1.613	1.543	95.7
2. Output of saw-mill products in cu. metres (per shift at saw-mill frame)	22.4	29.9	133.5

Table 9

PAPER INDUSTRY

(People's Commissariat of Timber)

Indices	1932	1937	1937 in % of 1932
1. Average annual output of paper per papermaking machine (thousand tons)	3.8	7.5	197.3
2. Average annual output of sulphite cellulose per cu. metre of kettle (tons)	31.4	40.3	128,3
3. Average annual output of wood pulp per pulp-grinder (thousand tons)	2.6	3.5	134.6
4. Average width of paper-making machines (millimetres)	2,360	2,570	108.9
5. Number of powerful machines (from 4 to 5.5 metres) newly installed	5[1]	15[2]	300.0

[1] Imported during the period of the First Five-Year Plan.
[2] During the period of the Second Five-Year Plan.

Table 10

TEXTILE INDUSTRY

Indices	1932	1937
I. Cotton Industry		
1. Total number of spindles (thousands)	8,002	11,200
of which:		
a) Mule spindles (thousands)	2,200	1,000
Percentage of total	27.5	9.0
b) With high and extra-high stretch (thousands)	200	4,480
Percentage of total	2.5	40.0
2. Total number of looms (thousands)	197.4	250
of which:		
Automatic looms (thousands)	21	100
Percentage of total	10.6	40.0
Degree of specialization		
1. Average number of yarn numbers per spinning mill	5.5	4.0
2. Average number of grades of unfinished material per weaving mill	3.2	2.1
3. Average number of grades of fabric per finishing mill	10.3	7.0
II. Woollen Industry		
1. Total number of yarn-making machines (thousands)	65.6	112.5
of which:		
Multiple yarn (thousands)	52.3	112.5
Percentage of total	80.0	100.0
2. Total number of spindles in fabric production (thous.)	279.4	350.0
of which:		
Khrushchov ring spindles (thousands)	—	105.0
Percentage of total	—	30.0
3. Total number of looms in fabric production	7,100	10,765
of which:		
High-speed looms	200	5,590
Percentage of total	2.8	52.0
4. Total number of looms in worsted production	5,100	6,370
of which:		
Automatic looms	—	2,700
Percentage of total	—	42.5
III. Linen and Hemp Industry		
1. Total number of flax spindles (thousands)	334	700
of which:		
High-speed spindles (thousands)	4.5	397
Percentage of total	1.4	57.0
2. Total number of hemp spindles	6,129	10,900
a) Output of spinning wheels (% of total capacity)	8.1	—
b) Output of semi-automatic machines (% of total capacity)	37.8	—
c) Output of gill-spinning machines (% of total capacity)	54.1	100

Table 11

FOOD INDUSTRY

Indices	1932	1937
I. Fish Industry		
1. Load per trawler (thousand centners)	12.0	18.0
Percentage of mechanized fishing	45.0	70.0
2. Percentage of trawling in major deep-sea fishing districts (all fisheries including collective fisheries)	12.0	41.0
3. Percentage of trawling in State industry in the major fishing districts	35.0	61.0
4. Structural changes in the manufacture of fish products (% of total)		
a) Fresh and frozen fish	31.1	39.0
b) Canned fish	2.9	7.5
c) Smoked fish	3.1	5.2
d) Special pickling	1.0	4.4
e) Salt herrings	18.0	19.9
f) Miscellaneous small salt fishes	40.6	20.3
g) Fertilizer, glue, leather and other industrial products	3.3	3.7
Total	100.0	100.0
II. Meat Industry		
1. Meat yield (% of weight of cattle on hoof)		
a) Beef	42.3	46.0
b) Pork	56.8	65.0
c) Mutton	38.8	43.0
2. Proportion of packing plant production in total output (%)	24.1	75.0
III. Sugar Industry		
1. Sugar yield (% of beet weight)	13.10	14.00
2. Sugar waste during refining (%)	2.87	2.40
3. Labour power consumed per centner of granulated sugar (man-hours)	5.60	3.00
4. Consumption of conventional fuel per 100 centners of sugar (tons)	7.90	6.45
IV. Vegetable Oil Industry		
Percentage of oil obtained by the extraction method in processing raw material	0.8	24.0

Table 12

BUILDING MATERIALS

Indices	Units of measurement	1932	1937	1937 in % of 1932
I. Cement Industry				
1. Consumption of raw material per barrel of cement (limestone and marl)	kg.	278	217	78.0
2. Consumption of clay	„	35.8 [1]	48.0	134.1
3. Consumption of fuel	„	41.5	36.0	86.7
4. Consumption of electric power	kwh.	12.8	14.0	109.5
5. Consumption of labour power	man-days	2.35	1.24	52.8
6. Utilization coefficient of equipment	%	75.4	95.0	—
7. Rotary kiln output in per cent of total kiln output	„	80.5	87.4	—
II. Glass Industry				
1. Average fuel consumption per unit of output (1 ton)	tons of conventional fuel	2.28	1.34	58.7
2. Electric power consumption per unit of output	kwh.	55.0 [1]	80.0	145.5
3. Percentage of mechanized production in total glass output	%	35	70	—

[1] Figures for 1933.

Table 13

COEFFICIENT OF UTILIZATION OF CONSTRUCTION MACHINERY [1]

Classification of machines	1932	1933	1937
1. Excavators	0.35	0.40	0.65
2. Stone crushers			
a) Individual	—	0.42	0.50
b) Factory-installed	—	0.56	0.67
c) Average weighted coefficient	0.35	0.43	0.65
3. Concrete mixers			
a) Individual	—	0.35	0.42
b) Factory	—	0.52	0.62
c) Average weighted coefficient	0.20	0.40	0.50
4. Riddling machines	0.30	0.40	0.65

[1] Coefficient of utilization denotes the ratio of the actual output of a machine to its maximum output capacity.

Table 14

STRUCTURAL CHANGES IN CONSTRUCTION MACHINERY
(in %)

Classification of machines	1933	1937
Concrete Mixers		
Capacity 150 litres	5.0	5.0
" 250 "	25.0	18.0
" 375 "	50.0	37.0
" 500 "	12.0	23.0
" 1000 "	8.0	17.0
Stone Crushers		
Jaw crushers:		
Capacity 4 cu. metres per hour	76.0	8.0
" 12 " " " "	24.0	12.0
" 25 " " " "	—	30.0
Conical crushing mills:		
Capacity 10 cu. metres per hour	—	20.0
" 50 " " " "	—	30.0

Table 15

BUILDING INDUSTRY

Classification of construction (in per cent of total)	1933	1937
1. Reinforced concrete	14.9	18.8
2. Stone and brick	56.0	57.5
3. Wood	22.9	18.2
4. Mixed	6.2	5.5
Total	100.0	100.0

Table 16

MECHANIZATION OF BUILDING OPERATIONS
(average for national economy, in %)

Classification of operations	1932	1937
1. Earth work by excavators	15.0	50.0
2. Hydraulic earth work	—	20.0
3. Cement mixing	65.0	95.0
4. Transportation on the job (horizontal)	30.0	80.0
5. Concrete pumping	—	24.0
6. Rubble crushing	50.0	90.0
7. Screening of aggregates	—	90.0
8. Stone quarrying (pneumatic)	45.0	90.0

Table 17

RAILWAY TRANSPORTATION

Indices	1932	1937	1937 in % of 1932
1. Average daily run of freight locomotives, all types of traction (km.)	146.0	180.0	123.3
2. Average daily run of freight cars (exclusive of switching, etc.) (km.)	97.3	125.0	128.5
3. Average daily run of passenger locomotives, all types of traction (km.)	224.0	290.0	129.4
4. Average daily run of passenger cars, all types of traffic (km.)	326.3	400.0	122.5
5. Average over-all speed of freight trains (km. per hour)	14.3	17.0	118.8
6. Live load per axle of freight car (tons)	5.3	6.0	113.1
7. Average number of axles per freight train, all types of traction	104.3	111.0	106.4
8. Average number of axles per passenger train, all types of traffic	37.8	40.4	106.9
9. Average gross weight of freight trains, in both directions (tons)	966.0	1,182.0	122.3
10. Mechanization of loading and unloading (%)	18.3	57.0	—
of which:			
Effected by the P. C. of Transportation	0.8	18.0	—

Table 18

WATERWAY TRANSPORTATION

Indices	1932	1937	1937 in % of 1932
A. Maritime Fleet			
1. Ton-miles per tonnage-day of operation	52.9	67.3	127.2
2. Average duration of operation period (in days)	231.0	293.0	126.8
3. Ton-miles per ton of cargo capacity	12,220.0	19,700.0	161.5
4. Mechanization of loading and unloading (by the resources of the P. C. of Waterway Transportation, in % of total)	14.0	72.0	—
B. River Fleet			
Volume of transportation per i.h.p. of steamships and motor boats and per ton of cargo capacity of the non-powered fleet (in thousand ton-km.)			
1. The Volga Basin			
a) Tugs towing tank barges	122.3	190.0	155.4
b) Tugs towing dry cargo barges	73.7	105.0	142.5
c) Tugs towing rafts	313.8	360.0	115.0
d) Non-powered tanker fleet	8.1	10.5	129.7
e) Non-powered dry cargo fleet	2.2	5.0	227.2
2. North-Western Basin			
a) Tugs towing tank barges	35.4	70.0	—
b) Tugs towing dry cargo barges		60.0	—
c) Non-powered tanker fleet	3.9	5.5	141.0
d) Non-powered dry cargo fleet	1.1	2.8	254.5
3. Dnieper Basin			
a) Tugs towing dry cargo barges	39.8	70.0	175.9
b) Tugs towing rafts	139.4	200.0	143.6
c) Non-powered dry cargo fleet	1.8	4.5	250.0
4. Mechanization of loading and unloading (by the resources of the P. C. of Waterway Transportation, in % of total)	12.0	56.0	—

Table 19

CIVIL AVIATION

Indices	1932	1937
1. Cruising speed of airway liners, freight and passenger, in km. per hour	140	200
2. Number of flying hours per registered machine per year	430	630
3. Average aeroplane commercial load (%)	66.4	80.0

Table 20

MOTOR FREIGHT HAULAGE

Indices	1932[1]	1937
1. Average daily number of trucks in operation (% of total registered)	48	75
2. Average daily run (km.)	125	140
3. Average daily run with load (km.)	75	90
4. Average load utilization (tonnage) in % of rating	87	95

[1] The figures for 1932 refer only to the motor fleet of the All-Union Transportation Board whose indices are above the average.

Table 21

NATIONAL COMMUNICATION

Indices	Units of measurement	1932	1937
1. High-speed telegraph installations, in % of total:			
a) Baudot multiplex	%	14.6	15.5
b) Treml and Shorin	"	0.09	29.1
2. Average frequency of mail delivery as of end of year:			
a) Inter-district routes	times per day	1.1	1.5
b) Intra-district routes	"	0.85[1]	1.2
c) City delivery	"	3.5[1]	4.5
3. Maximum time allowed between sending and delivering of telegrams from Moscow to republic, territorial, or regional centres and back, or in inter-regional communication:			
a) Without re-transmission in communication, with direct transmission and receipt:			
1. For ordinary telegrams	hours	4.5[1]	3.0
2. For Government telegrams	"	2.5[1]	1.5
b) With 1-2 re-transmissions:			
1. For ordinary telegrams	"	8.0[1]	5.0
2. For Government telegrams	"	4.0[1]	2.5
c) From regional centre to district centre and back	"	4.5[1]	2.5
4. Coefficient of effective utilization of high-speed telegraph apparatus at hours of peak load	%	68.0[1]	75.0
of which: Baudot	"	70.0[1]	85.0
5. Time allowed for repairing lines out of order in cities (in day time)	hours	8.0[1]	5.0

[1] Here 1933 figures are given, according to the year's plan.

Table 22

MECHANIZATION OF MAIN PRODUCTION PROCESSES IN AGRICULTURE
(in %)

Character of operations	1932	1937
1. Preparing the land for seed by tractor-drawn implements (ploughing, including late autumn ploughing)	19	80
2. Spring sowing by tractor-drawn sowing machines	20	55
3. Reaping of grains by tractor-drawn harvesters	10	60 [1]
of which:		
a) By harvester-combines	4	30 [1]
4. Threshing (by threshing machines)	40	85
5. Cultivation (of fallow land and row crops) by tractor-drawn cultivators	7	70

[1] In the principal grain districts (Northern Caucasus, the Ukraine, etc.) 75-80% of the harvesting will be mechanized in 1937 by using tractor-drawn reapers, up to 50% of which will be done by harvester-combines.

Table 23

NUMBERS OF AGRICULTURAL MACHINES
(per 1000 ha. of sowing area)

Classification of agricultural machinery	1932	1937
1. Tractor-drawn ploughs by spring (in single bottoms)	3.6	14.3
2. Sowing machines by spring	1.5	3.2
3. Harvester combines by harvest time	0.13	1.0
4. Grain binders	0.22	0.7
5 Windrowers	0.04	0.33
6. Threshing machines	0.65	0.8
7. Wide-frame flax-pulling machines	—	5.0
8. Pickers	0.46	3.3
9. Potato diggers	0.08	2.30

VII. POPULATION, LABOUR AND CADRES

Table 1

CHANGES IN THE POPULATION OF THE U.S.S.R.

(as of end of year, in million persons)

Groups	1932	1937	1937 in % of 1932
Total population	165.7	180.7	109.1
of which:			
Urban A	39.7	46.1	116.1
„ B	39.7	49.1	123.7
Rural A	126.0	134.6	106.8
„ B	126.0	131.6	104.4
Proportion of urban population (% of total):			
A	24.0	25.5	—
B	24.0	27.2	—

Note: A—Without taking into account rural places transformed into places urban in type.

Note: B—Taking into account the transformation of large State farms, district centres growing out of machine and tractor stations, factories for the primary processing of agricultural products, etc., into places urban in type

Table 2

NUMBERS AND WAGES OF WORKERS AND EMPLOYEES

Branches of national economy	Numbers (thousand persons)			Average annual wages (rubles)			Total wage fund (million rubles)		
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
I. Industry:	7,968.4	10,204.0	128.0	1,410.1	1,778.5	126.1	11,236.4	18,147.6	161.5
A. Large-scale industry	6,302.6	8,130.0	129.0	1,466.0	1,860.6	126.9	9,240.5	15,126.7	163.7
of which:									
Workers	4,668.5	6,361.0	136.3	1,385.0	1,736.2	125.4	6,467.1	11,044.5	170.8
Employees	516.1	500.0	96.9	2,076.0	2,353.0	113.3	1,071.7	1,176.5	109.8
Engineers and technicians	331.3	520.0	157.0	3,634.0	4,361.0	120.0	1,203.9	2,267.7	188.4
Junior service personnel	302.4	402.0	132.9	888.0	1,074.5	121.0	268.4	431.9	160.9
Apprentices	484.3	347.0	71.6	474.0	594.0	125.3	229.4	206.1	89.8
B. Small scale industry	247.5	347.0	140.2	1,251.0	1,490.0	119.1	309.7	517.0	166.9
C. Workers and employees of the handicraft and invalids' co-operative organizations	178.7	232.0	129.8	1,720.0	2,150.0	125.0	307.4	498.8	162.3
D. Fish industry	99.4	135.0	135.8	1,319.0	1,847.0	140.1	131.1	249.3	190.2
E. Forestry	1,140.2	1,360.0	119.3	1,094.0	1,291.0	118.0	1,247.7	1,755.8	140.7
II. Building	3,125.8	3,425.0	109.6	1,509.0	1,794.0	118.9	4,715.9	6,145.1	130.3
III. Railway transportation	1,526.5	1,666.0	109.1	1,496.0	1,859.0	124.3	2,282.9	3,097.4	135.7

IV. Waterway transportation	195.5	230.0	117.6	1,509.0	1,977.0	131.0	295.0	454.7	154.1
V. Miscellaneous transportation	500.0	880.0	176.0	1,539.0	1,985.0	129.0	769.4	1,746.8	227.0
VI. National communication	224.3	336.0	149.8	1,333.0	1,655.0	124.2	298.9	556.0	186.0
VII. Trade	1,410.8	2,285.0	162.0	1,351.0	1,533.0	113.5	1,905.9	3,502.9	183.8
VIII. Public catering	515.1	860.0	167.0	1,059.0	1,200.0	113.3	545.7	1,032.0	189.1
IX. Credit institutions	128.4	135.0	105.1	1,834.0	2,293.0	125.0	240.1	309.6	128.9
X. Education	1,347.2	2,065.0	153.3	1,633.0	1,960.0	120.0	2,800.0	4,847.4	173.1
XI. Art	84.5	123.0	145.6	1,989.0	2,745.0	138.0	168.1	337.6	200.8
XII. Public health	647.2	1,020.0	157.6	1,248.0	1,560.0	125.0	819.3	1,591.2	194.2
XIII. State and social institutions	1,833.5	1,470.0	80.2	1,941.0	2,368.0	122.0	3,559.5	3,481.0	97.8
XIV. Municipal enterprises	236.6	331.0	139.9	1,453.0	1,671.0	115.0	343.7	553.1	160.9
XV. Miscellaneous non-agricultural labour	341.5	304.0	89.0	828.0	969.0	117.0	282.8	294.6	104.2
XVI. Agriculture	2,857.5	3,575.0	125.1	866.0	1,299.0	150.0	2,474.1	4,645.0	187.7
Total for all branches of national economy	22,942.8	28,909.0	126.0	1,427.0	1,755.0	123.0	32,737.7	50,742.0	155.0

Table 3

SUPPLEMENTARY LABOUR POWER REQUIRED AND SOURCES FROM WHICH DERIVED
(all categories of workers and employees exclusive of factory vocational school students)

Branches of national economy	Number of persons working in 1932 (as of end of year, exclusive of apprentices)	Increased number required as result of increased production and development of cultural and social services	Decrease in number of persons working due to natural causes and to enrolment for study	Supplementary forces taken on due to increased production and as replacement for workers lost to production	Sources of replenishment						Number of persons working in 1937 (as of end of year exclusive of apprentices)
					Cadres in training at factory vocational schools, colleges, middle schools, technical schools, etc.	Women from proletarian families who previously did not work	Redistribution of forces released from other branches of economy	Urban youth graduated from schools, etc.	Other urban sources	Organized recruitment of labour power in the villages	
In all national economy (thousand persons) . .	21,986.4	7,131.9[2]	3,378.0	10,509.9	4,184.1	1,300.0	585.0	1,000.0	190.0	3,250.8	28,502.3[3]
In % of total . .	—	—	—	100.0	39.8	12.4	5.6	9.5	1.8	30.9	—
of which											
a) Industry (thousand persons)	6,451.1	2,231.7	1,188.0	3,419.7	2,057.9	360.0	60.0	400.0	40.0	501.8	8,666.8
In % of total . .	—	—	—	100.0	60.2	10.5	1.8	11.7	1.2	14.6	—
b) Construction (thousand persons) . . .	2,674.4	570.6	358.0	928.6	175.4	120.0	35.0	100.0	70.0	428.2	3,177.0
In % of total . .	—	—	—	100.0	18.9	12.9	3.8	10.8	7.5	46.1	—
c) Transportation (thousand persons) .	2,051.9	693.1	353.0	1,046.1	408.3	92.0	35.0	80.0	60.0	370.8	2,740.0
In % of total . .	—	—	—	100.0	39.1	8.8	3.3	7.6	5.7	35.5	—

d) State farms, machine and tractor stations and forestry (thousand persons) . . .	3,764.4	872.6	410.0	1,282.6	561.5	70.0	10.0	20.0	—	621.1	4,612.0
In % of total . .	—	—	—	100.0	43.8	5.4	0.8	1.6	—	48.4	—

[1] Included in this figure are student-workers and employees. Apart from the sources indicated, national economy will receive upward of 2,000,000 trained workers through the collective farm schools, schools for chauffeurs, combine operators, tractor driver brigadiers, etc.

[2] The figure 7,131,900 is not the net increase. The latter is equal to 6,515,900 persons and is composed of the increase of 7,131,900 persons, minus 616,000 persons subject to redistribution among other branches of industry and to be released from work in the administrative or managerial apparatus as a result of its improved work. (Of this number, 16,000 are to be released in industry, 68,000 in the building trades and 25,000 in agriculture and forestry.)

[3] The number in 1937 will be equal to that in 1932 plus all replenishments minus the number of persons to be redistributed (see footnote No. 2).

Table 4

NUMBERS OF FEMALE WORKERS AND EMPLOYEES
(as of end of year)

Branches of national economy	1932		1937		1937 in % of 1932
	Absolute figures (thousand persons)	Percentage of total	Absolute figures (thousand persons)	Percentage of total	
National economy as a whole .	6,819.3	29.9	9,854.0	33.9	144.5
Industry [1]	2,335.0	33.8	3,340.0	37.0	143.0
of which: Large-scale industry	2,206.7	34.5	3,170.0	38.0	143.7
Construction	437.8	16.1	561.0	17.6	128.1
Transportation	293.2	13.3	458.0	16.4	156.3
Public catering	363.4	64.7	650.0	69.0	178.9
Education	795.5	55.5	1,271.0	58.0	159.8
Public health	475.7	70.7	776.0	73.0	163.1
Agriculture	556.4	23.9	823.0	27.5	147.9

[1] Exclusive of forestry.

Table 5

LABOUR PRODUCTIVITY, NUMBERS OF WORKERS AND AVERAGE ANNUAL WAGES IN THE MAIN BRANCHES OF NATIONAL ECONOMY

Branches of national economy	Standards for measuring labour productivity	Productivity of labour			Numbers of workers (thousands)			Average annual wages of workers (in rubles)		
		1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
I. Industry	Output per worker (in rbls., 1926-27 prices)	—	—	163.0	4,668.5	6,361.0	136.2	1,385.0	1,736.2	125.4
A. Large-scale industry . . of which:										
1. P. C. of Heavy Industry of which:	„	6,335.0	11,086.0	175.0	2,234.0	3,007.0	134.6	1,570.0	1,963.0	125.0
a) Machinery production (under all-Union control)	„	7,496.0	13,868.0	185.0	600.1	862.3	143.7	1,747.6	2,022.0	115.7
b) Iron and steel[1] . . .	„	5,530.0	11,060.0	200.0	241.3	325.5	134.9	1,601.2	1,984.0	123.9
c) Coal industry (incl. of the coal mines under P. C. of Transportation, but excl. of industry of local importance)	„	2,079.0	3,971.0	191.0	317.3	380.0	119.8	1,448.0	1,875.0	129.5
2. P. C. of Light Industry of which:	„	7,198.2	10,942.0	152.0	1,088.2	1,782.0	163.8	1,086.2	1,439.2	132.5
a) Cotton industry . .	„	6,673.7	9,877.0	148.0	385.3	544.6	141.3	1,007.2	1,400.0	139.0
b) Woollen industry . .	„	8,207.2	13,132.0	160.0	71.4	112.0	156.9	1,063.1	1,420.0	133.6
c) Leather and shoe industry	„	9,537.2	13,542.0	142.0	131.4	173.5	132.0	1,304.8	1,565.0	119.9
3. P. C. of Timber (exclusive of timber cutting)	„	5,509.0	8,815.0	160.0	162.4	219.6	135.2	1,214.0	1,493.0	123.0
4. P. C. of Supply (excl. of central kitchens) .	„	12,608.0	20,173.0	160.0	354.5	560.0	158.0	1,113.6	1,358.0	121.9

[1] Exclusive of output of metallurgical departments of machinery plants.

Table 5—continued

Branches of national economy	Standards for measuring labour productivity	Productivity of labour			Numbers of workers (thousands)			Average annual wages of workers (in rubles)		
		1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
B. Timber cutting	output per worker (in rbls., 1926-27 prices)	1,797.0	2,385.0	132.7	722.9	892.0	123.4	923.0	1,153.0	124.9
of which:										
Timber cut by the P. C. of Timber	"	1,784.0	2,391.0	134.0	490.4	674.0	137.4	911.4	1,130.0	124.1
II. Construction	output per worker (in rbls., in prices of 1933)	3,860.0	6,755.0	175.0	2,478.8	2,842.0	114.7	1,377.0	1,615.0	117.3
III. Railway transportation (operation)	thousand ton-km. per worker (converted)	236.1	337.7	143.0	1,071.3	1,223.0	114.2	1,548.3	1,907.0	123.2
IV. Waterway transportation	" thousand conventional units per worker	430.6	801.0	186.0	107.3	145.0	135.2	1,509.0	1,977.0	131.0
V. P. C. of Communication (basic production staff)	volume of work per worker (in % of 1932)	50.0	71.9	143.8	196.4	285.0	145.1	1,299.4	1,600.0	123.1
VI. Trade (entire trading personnel)		—	—	154.3	1,410.8	2,285.0	162.0	1,351.0	1,533.0	113.5
VII. Public catering	output per worker (in standard dishes)	—	—	150.0	515.1	860.0	167.0	1,059.0	1,200.0	113.3
VIII. State farms of the P. C. of State Farms (exclusive of State pure-bred cattle farms) . .	output per worker (in rubles in 1926-27 prices, based on gross turnover)	431.0	1,061.0	246.0	684.9	947.0	138.3	823.4	1,243.0	151.0

Table 6

NUMBERS AND WAGES OF WORKERS AND EMPLOYEES IN THE ESTABLISHMENTS UNDER THE FOUR INDUSTRIAL PEOPLE'S COMMISSARIATS

People's Commissariats and categories of personnel	Numbers (in thousands)			Average annual wages (in rubles)		
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932
P. C. of Heavy Industry	3,149.3	3,912.0	124.2	1,638.6	2,117.1	129.2
Workers	2,234.0	3,007.0	134.6	1,570.0	1,963.0	125.0
Employees	248.3	225.0	90.6	2,130.5	2,474.0	116.1
Engineers and technicians	216.9	325.0	149.8	3,877.8	4,657.0	120.1
Junior service personnel	146.0	185.0	126.7	876.0	1,081.0	123.4
Apprentices	304.1	170.0	55.9	509.7	643.0	126.2
P. C. of Light Industry	1,349.6	2,140.0	158.6	1,161.8	1,532.6	131.9
Workers	1,088.2	1,782.0	163.8	1,086.2	1,439.2	132.5
Employees	84.2	93.0	110.5	1,881.2	2,180.0	115.9
Engineers and technicians	49.1	100.0	203.7	3,138.8	3,816.0	121.6
Junior service personnel	34.4	55.0	159.9	937.8	1,209.0	128.9
Apprentices	93.7	110.0	117.4	437.6	585.0	133.7
P. C. of Timber	225.4	285.6	126.7	1,303.0	1,621.5	124.4
Workers	162.4	219.6	135.2	1,214.0	1,493.2	123.0
Employees	20.9	19.0	90.9	1,938.0	2,148.0	110.8
Engineers and technicians	10.9	17.0	156.0	3,166.0	3,877.0	122.5
Junior service personnel	17.5	22.0	125.7	895.0	1,093.0	122.1
Apprentices	13.7	8.0	58.4	436.0	560.0	128.4
P. C. of Supply	494.4	750.4	151.8	1,296.1	1,510.0	116.5
Workers	354.5	560.0	158.0	1,113.6	1,358.0	121.9
Employees	63.2	66.4	105.1	2,063.0	2,088.0	101.2
Engineers and technicians	27.2	49.0	180.1	2,981.5	3,571.0	119.8
Junior service personnel	32.3	50.0	154.8	797.3	908.0	113.9
Apprentices	17.2	25.0	145.3	515.4	547.0	106.1
Total employed by the four industrial People's Commissariats	5,218.7	7,088.0	135.8	1,468.4	1,856.4	126.4
Workers	3,839.1	5,568.6	145.0	1,375.7	1,716.0	124.7
Employees	416.6	403.4	96.8	2,060.7	2,327.2	112.9
Engineers and technicians	304.1	491.0	161.5	3,653.0	4,350.0	119.1
Junior service personnel	230.2	312.0	135.5	875.3	1,076.6	123.0
Apprentices	428.7	313.0	73.0	491.5	613.0	124.7

Table 7

PLAN FOR SUPPLYING SOVIET NATIONAL ECONOMY WITH SPECIALISTS
(in thousand persons)

Branches of national economy	Number of specialists in 1932 [1]					Number of specialists in 1937 [2]					1937 in % of 1932		Graduate specialists in % of total	
	Specialists graduated from			Persons who have completed special courses and persons with practical experience but no special education	Total	Specialists graduated from			Persons who have completed special courses and persons with practical experience but no special education	Total	All specialists	Graduate specialists	1932	1937
	Colleges	Middle schools	Total			Colleges	Middle schools	Total						
Total for the U.S.S.R. . . .	462.4	903.7	1,366.1	1,371.1	2,737.2	739.2	1,583.8	2,323.0	1,686.9	4,009.9	146.5	170.0	49.9	57.9
of which:														
1. Industry	50.7	71.8	122.5	208.8	331.3	118.8	181.0	299.8	220.2	520.0	157.0	244.7	37.0	57.7
a) P. C. of Heavy Industry	38.6	48.4	87.0	129.9	216.9	90.0	116.5	206.5	118.5	325.0	149.8	237.4	40.1	63.5
b) „ „ Light Industry [3]	4.3	7.6	11.9	25.1	37.0	9.7	24.5	34.2	52.8	87.0	235.1	287.4	32.2	39.3
c) „ „ Timber . . .	1.0	2.5	3.5	7.4	10.9	3.1	4.8	7.9	9.1	17.0	156.0	225.7	32.1	46.5
d) „ „ Supply	2.9	5.4	8.3	18.9	27.2	9.6	21.0	30.6	18.4	49.0	180.1	368.7	30.5	62.4
2. Geological and geodetic surveying	3.3	5.8	9.1	1.8	10.9	7.9	11.2	19.1	1.0	20.1	184.4	209.9	83.5	95.0
3. Construction [4]	15.3	25.7	41.0	42.0	83.0	27.2	58.1	85.3	39.7	125.0	150.6	208.0	49.4	68.2
4. Agriculture	33.7	50.0	83.7	133.9	217.6	102.7	186.0	288.7	136.3	425.0	195.3	344.9	38.5	67.9
5. Forestry	2.6	8.5	11.1	21.5	32.6	5.8	15.6	21.4	29.6	51.0	156.4	192.8	34.0	42.0

6. Transportation and communication	4.3	29.2	33.5	73.5	107.0	20.2	89.4	109.6	65.0	174.6	163.2	327.2	31.3	62.8
of which:														
a) Railway transportation	2.2	12.4	14.6	49.5	64.1	9.6	39.7	49.3	42.3	91.6	142.9	337.7	22.8	53.8
b) Waterway transportation	0.6	10.1	10.7	16.1	26.8	3.5	21.7	25.2	14.8	40.0	149.3	235.5	39.9	63.0
c) Motor transportation	0.9	4.7	5.6	1.6	7.2	4.0	19.1	23.1	1.9	25.0	347.2	412.5	77.8	92.4
d) Communication . .	0.6	2.0	2.6	6.3	8.9	3.1	8.9	12.0	6.0	18.0	202.2	461.5	29.2	66.7
7. Education	156.9	382.1	539.0	531.0	1,070.0	222.2	603.0	825.2	709.9	1,535.1	143.5	153.1	50.4	53.8
of which:														
Universal compulsory education	43.2	344.0	387.2	240.8	628.0	86.8	466.7	553.5	280.5	834.0	132.8	142.9	61.7	66.4
8. Public health [5]	76.3	135.0	211.3	69.8	281.1	97.0	203.0	300.0	100.0	400.0	142.3	142.0	75.2	75.0

[1] The 1932 figures for industry are the annual averages computed from the labour statistics by the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R. and various departmental bodies. The figures for the other branches of national economy are given as of the end of the year and are taken from material contained in the departmental census of specialists in 1932, from school statistics (universal compulsory education), trade union statistics, the census of cadres engaged in trade and other sources.

[2] The supply of specialists in 1937 will meet the total demand in all sectors of national economy except education and public health. In these branches the shortage will be covered by letting one specialist fill more than one position.

[3] Exclusive of brigade leaders in the leather industry, and instructors in the needle trades industry.

[4] Exclusive of group foremen and brigade leaders.

[5] The figures for the medium medical personnel do not include crèche nurses.

Table 8

PLAN FOR THE TRAINING OF CADRES
Stationary Network (in thousand persons)

Types of educational institutions	Numbers of students (thousands) by end of year						1937 in % of 1932	Enrolled during the five years	Graduated during the five years
	1932	1933	1934	1935	1936	1937			
I. Training of Executive Personnel									
1. Academies	8.2	8.2	10.0	11.0	12.3	12.9	157.3	17.2	8.5
2. Communist Agricultural Colleges	22.5	38.2	43.4	41.2	40.2	40.2	178.7	93.2	63.2
Total number of executives	30.7	46.4	53.4	52.2	52.5	53.1	173.0	110.4	71.7
II. Training of Specialists									
1. Colleges	469.8	419.2	475.1	518.9	585.6	660.6	140.6	837.3	336.3
of which for:									
a) Industry	180.5	146.2	153.1	158.9	173.7	197.4	109.4	242.1	112.3
b) Transportation and communication	46.0	38.2	38.7	40.4	43.7	48.1	104.6	57.4	27.6
c) Agriculture	62.2	60.6	74.1	82.2	94.2	105.7	169.9	132.2	53.5
d) Education	93.5	89.8	107.7	121.8	140.8	160.5	171.7	221.6	77.5
e) Medicine	46.4	48.1	58.0	66.7	79.8	90.0	194.0	105.0	33.7
2. Middle technical schools	797.0	672.8	790.8	896.2	1,022.3	1,140.1	143.0	1,751.0	850.5
of which for:									
a) Industry	212.6	157.6	174.5	198.3	230.8	261.4	122.9	374.6	171.9
b) Transportation and communication	103.3	72.5	88.1	96.4	109.7	126.2	122.2	191.0	97.0
c) Agriculture	150.6	121.4	147.0	165.8	181.7	196.8	130.7	304.1	152.7
d) Education	192.1	196.6	234.3	265.9	299.2	323.0	168.1	526.1	246.9
e) Medicine	59.3	62.4	76.8	86.9	103.9	121.2	204.4	190.8	100.3
Total number of specialists	1,266.8	1,092.0	1,265.9	1,415.1	1,607.9	1,800.7	142.1	2,588.3	1,186.8

III. Training of Cultural and Political Workers									
1. Communist Colleges	8.5	8.9	11.0	13.2	15.3	16.7	196.5	25.1	8.2
2. Soviet and Party schools	40.0	42.1	59.8	60.0	62.0	65.0	162.5	272.8	222.0
Total number of cultural and political workers	48.5	51.0	70.8	73.2	77.3	81.7	168.5	297.9	230.2
IV. Training of Scientists and Pedagogues									
1. Post-graduate students in colleges	11.0	8.4	8.1	8.0	8.4	9.6	87.3	15.2	10.7
2. Institutes of Red Professors	3.1	1.8	2.0	2.2	2.5	2.8	90.3	4.3	2.8
3. Institutes of Marxism-Leninism	1.3	1.4	1.7	1.8	2.0	2.4	184.6	3.5	1.6
Total number of scientists and pedagogues	15.4	11.6	11.8	12.0	12.9	14.8	96.1	23.0	15.1
V. Mass Training of Skilled Workers									
1. Factory vocational schools of which:	958.9	520.0	370.0	439.2	495.1	595.7	62.1	2,779.9	2,736.3
Agricultural schools	105.1	65.0	42.5	50.0	56.0	67.0	63.7	263.0	237.0
2. Tractor schools and courses	—	116.0	165.0	173.0	185.0	200.0	—	839.0	548.0
3. Schools for tractor driver brigadiers	—	19.1	25.0	29.5	34.0	36.5	—	144.1	95.5
4. Schools for tractor and automobile mechanics	—	5.6	8.0	11.0	13.5	16.0	—	54.1	33.8
5. Schools for harvester-combine operators	—	19.0	22.0	25.0	30.0	35.0	—	131.0	86.1
6. District collective farm schools	—	85.2	100.0	130.0	160.0	200.0	—	675.0	430.0
7. Training of chauffeurs (schools and courses)	75.0	85.0	150.0	190.0	230.0	250.0	333.3	905.0	700.0
8. Schools for locomotive engineers	—	1.0	2.6	3.0	3.6	4.2	—	16.2	10.5
Total number of workers receiving mass training	1,033.9	850.9	842.6	1,000.7	1,151.2	1,337.4	129.4	5,544.3	4,640.2
VI. Workers' Colleges	352.7	326.0	378.1	452.0	533.0	622.0	176.4	949.3	371.2
Grand total	2,748.0	2,377.9	2,622.6	3,005.2	3,434.8	3,909.7	142.3	9,513.2	6,515.2

Table 9

PRINCIPAL ITEMS OF EXPENDITURE FOR CULTURAL AND SOCIAL SERVICES FOR THE WORKERS [1]

Items of cultural and social service	Appropriations for cultural and social services for non-agricultural workers (million rubles)		1937 in % of 1932	Appropriations for cultural and social services (% of the individual wages of the same)	
	1932	1937		1932	1937
1. Social insurance benefits . . .	910.1	1,342.2	147.5	6.7	6.2
of which:					
a) Temporary disability benefits (including benefits of a supplementary nature) . .	553.3	666.4	120.4	4.1	3.1
b) Pensions	323.7	620.7	191.8	2.4	2.9
c) Miscellaneous social insurance benefits	33.1	55.1	166.5	0.2	0.2
2. Trade union benefits	26.0	55.2	212.3	0.2	0.2
3. Scholarships	508.2	1,651.8	325.0	3.7	7.7
4. Education and cultural service	1,770.3	3,528.9	199.3	13.0	16.4
5. Public health	1,033.0	2,586.2	250.4	7.6	12.0
6. Fund for the improvement of workers' living conditions . .	60.8	120.0	197.4	0.4	0.6
Total	4,308.4	9,284.3	215.5	31.6	43.1

[1] Exclusive of workers employed in agriculture.

VIII. PLAN FOR THE REDUCTION OF PRODUCTION COSTS

Table 1

REDUCTION OF PRODUCTION COSTS IN THE PRINCIPAL BRANCHES OF NATIONAL ECONOMY

Branches of national economy	Changes in commercial production costs		of which:									
			Raw and auxiliary materials [2]		Fuel and electric power [3]		Excess of increase in labour productivity over increase in wages		Depreciation		Overhead and other unproductive expenses	
	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles in 1937 as compared with 1932	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles*	Percentage of reduction by 1937 as compared with 1932*	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932
I. Total in industry [1] . . .	26.0	13,003.6	3,471.4	14.2	869.2	25.0	5,638.2	30.5	—22.8	—1.2	3,047.6	45.9
of which:												
P. C. of Heavy Industry .	32.5	6,667.0	1,076.4	17.3	618.0	27.0	3,572.8	36.1	—95.6	—7.0	1,495.4	50.1
P. C. of Timber	19.5	773.6	206.8	15.8	17.6	21.1	301.1	17.9	—	—	248.1	27.8
P. C. of Light Industry .	16.0	2,204.4	607.4	8.8	130.2	20.1	991.6	20.8	44.0	12.3	431.2	39.1
P. C. of Supply [4]	25.0	2,975.3	1,384.7	17.5	92.2	22.8	682.4	37.0	27.1	12.0	788.9	52.4
Produce Procurement Committee of the Council of People's Commissars [5] .	15.0	383.3	196.1	9.5	11.2	22.0	90.3	33.0	1.7	7.4	84.0	58.8
II. Handicraft co-operative organizations [6]	19·0	1,943.7	554.9	12.0	118.7	29.0	643.3	24.0	—3.2	—5.0	811.1	23.6

[1] The percentage of reduction in production costs for industry as a whole; for the individual People's Commissariats and branches of industry it is computed on the basis of commodity production adjusted from year to year for the purpose of comparison. The savings achieved by 1937 are given as accumulated during the five-year period and are inclusive of new output.

[2] Exclusive of changes in trust selling prices and procurement prices effected after 1932.

[3] Exclusive of price increases of oil products in December 1933.

[4] The elements constituting the production costs in the branches of the People's Commissariat of Supply are computed according to calculation data.

[5] Inclusive of a 45% reduction in procurement expenditures for raw material.

[6] The division according to factors is subject to revision.

* The minus sign denotes, not a saving, but an excess expenditure.

Table 1—continued.

Branches of national economy	Changes in commercial production costs		of which:									
			Raw and auxiliary materials [2]		Fuel and electric power [3]		Excess of increase in labour productivity over increase in wages		Depreciation		Overhead and other unproductive expenses	
	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles in 1937 as compared with 1932	Saving in million rubles *	Percentage of reduction by 1937 as compared with 1932 *	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932	Saving in million rubles *	Percentage of reduction by 1937 as compared with 1932 *	Saving in million rubles	Percentage of reduction by 1937 as compared with 1932
III. Construction (proper) [7]	40.0	8,729.0	4,475.0	39.9	—	—	2,475.0	37.0	—	—	1,779.0	48.6
IV. Transportation . . .	40.0	7,465.8	—	—	—	—	—	—	—	—	—	—
of which:												
1. Railway transportation	10.5	591.4	—	—	62.6	9.1	478.8	15.3	—58.6	—5.9	108.6	13.4
2. Waterway transportation	36.0	434.4	—	—	79.8	42.7	164.3	31.9	8.7	7.4	181.6	47.3
3. Motor transportation .	54.0	6,440.0	—	—	—	—	—	—	—	—	—	—
V. P. C. of State Farms . .	63.3	1,650.9	—	—	—	—	—	—	—	—	—	—
VI. Trade (expenses of distribution of consumers' co-operative organizations and State trade) .	26.0	1,665.6	—91.0	—80.0	—	—	948.7	34.0	—3.2	—5.0	811.1 [8]	23.6
Total (exclusive of P. C. of State Farms and motor transportation)	26.4	26,367.7	8,410.3	20.8	1,130.3	23.8	10,348.3	30.2	—75.9	—2.4	6,554.7	37.6
Grand total	30.0	34,458.6	—	—	—	—	—	—	—	—	—	—

[2]—[3] See note on previous page.

[7] Inclusive of the following reductions in the cost of construction: industrial — by 43 %, housing — by 40 %, agricultural—by 35 %, transportation—by 36 %, and municipal—by 38 %.

[8] Of which 270,000,000 rubles for transportation expenses.

* The minus sign denotes, not a saving, but an excess expenditure.

Table 2

DEVELOPMENT OF REDUCTION OF PRODUCTION COSTS
(in % of preceding year within the scope of the comparable output)

Branches of national economy	1933 [1]	1934	1935	1936	1937	1937 in % of 1932	Accumulated reduction for the five years (reduction for the five years in comparison with level of 1932)	Saving effected by reduction of production costs (million rubles)	
								1937 compared with 1932	For the five years, compared with 1932 *
All industry (under the four industrial People's Commissariats and the Produce Procurement Committee of the Council of People's Commissars)	1.5	4.7	6.7	7.6	8.5	26.0	14.7	13,003.6	26,489.0
of which:									
P. C. of Heavy Industry	4.5	7.0 [3]	8.0	9.1	9.2	32.5	19.8	6,667.0	15,544.0
P. C. of Timber	—4.0	4.0	6.0	7.0	7.7	19.5	8.7	773.6	1,273.2
P. C. of Light Industry	—2.5	1.8	5.0	6.0	6.7	16.0	7.8	2,204.0	3,334.5
P. C. of Supply	0.0	4.0	6.9	8.0	8.8	25.0	13.5	2,975.3	5,571.1
Construction proper	0.0	15.0	10.0	10.5	11.5	40.0	26.0	8,799.0	—

[1] Expected fulfilment.

[2] The calculated saving for the five years represents the difference between the value of commodity production for the five years at the cost of production in 1932, and the planned cost of production of each year.

[3] Inclusive of synthetic rubber.

* The minus sign denotes, not a saving, but an excess expenditure.

Table 3

PLAN FOR THE REDUCTION OF PRODUCTION COSTS IN THE PRINCIPAL BRANCHES OF INDUSTRY

Branches of industry	Changes in commercial production costs	
	Percentage of reduction in 1937 as compared with 1932	Economy effected in 1937 as compared with 1932 (in mill. rbls.)
Total for all industry	**26.0** [1]	**13,003.6**
of which:		
P. C. of Heavy Industry	32.5	6,667.0
of which:		
1. Chief Power Board [2]	29.1	354.5
2. Coal	32.4	838.0
3. Peat	33.0	89.8
4. Iron and steel industry	33.0	1,337.1
5. Non-ferrous metals [3]	30.0	331.1
6. Machinery industry [4]	40.0	2,125.7
7. Chemical industry (exclusive of rubber)	28.5	558.1
P. C. of Timber	19.5	773.6
of which:		
1. Timber industry [5]	17.0	251.0
2. Saw-mill products and wood-working industry [6]	22.5	337.7
3. Paper industry	18.0	100.8
P. C. of Light Industry	16.0	2,204.4
of which:		
1. Cotton	13.7	392.7
2. Woollen	15.0	120.4
3. Linen	15.7	180.5
4. Knit goods	20.0	249.2
5. Needle trades	11.3	344.6
6. Leather and shoe	17.0	285.0
P. C. of Supply	25.0	2,975.3
of which:		
1. Meat	24.5	540.7
2. Fish	25.0	321.2
3. Sugar	45.5	689.5
4. Vegetable oil	15.0	55.8
5. Canned goods	18.0	78.4
6. Alcohol	29.0	140.0
7. Tobacco	9.0	26.2

[1] Exclusive of changes in trust selling prices and procurement prices effected after 1932.
[2] In the Chief Power Board plants the reduction in production costs includes the reduction due to the increased proportion of the cheaper hydro-electric power which itself yields a reduction in production costs of approximately 10 per cent.
[3] Inclusive of aluminium, on the basis of yearly plan assignments.
[4] In machinery production the planned 40 per cent reduction is based on the yearly plan assignments, adjusted from year to year for purposes of comparison. The saving of 2,125,000,000 rubles is gained by a reduction in production costs, by 1937, with 76 per cent of the output comprised within the scope of comparison.
[5] Exclusive of allowance for length of haul and relative increase in stripping and floating, production costs in the timber industry are being reduced by more than 20 per cent.
[6] Allowing for the reduction in the cost of saw logs.

IX. COMMODITY CIRCULATION

Table 1

DEVELOPMENT AND STRUCTURAL CHANGES IN COMMODITY CIRCULATION OF STATE AND CO-OPERATIVE TRADE

(in average weighted retail prices of 1932, in million rubles)

Commodities	1932			1937			1937 in % of 1932			Proportion between urban and rural			
										1932		1937	
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Urban	Rural
1. Foodstuffs	7,990	2,155	10,145	18,055	5,125	23,180	226.0	237.8	228.5	78.8	21.2	77.9	22.1
2. Manufactured goods for general consumption	10,910	6,060	16,970	26,030	18,090	44,120	238.6	298.5	260.0	64.3	35.7	59.0	41.0
Total	18,900	8,215	27,115	44,085	23,215	67,300	233.3	282.6	248.2	69.7	30.3	65.5	34.5
3. Public catering . . .	4,175	625	4,800	11,040	1,660	12,700	264.4	265.6	264.6	87.0	13.0	86.9	13.1
Total (exclusive of the tobacco and alcohol groups)	23,075	8,840	31,915	55,125	24,875	80,000	238.9	281.4	250.7	72.3	27.7	68.9	31.1

Table 2

OUTPUT OF THE PRINCIPAL MANUFACTURED ARTICLES OF GENERAL CONSUMPTION

(produced by State industry and handicraft co-operative organizations)

Indices	Units of measurement	1932	1937	1937 in % of 1932
1. Cotton fabrics	mill. m	2,719.7	5,100.0	187.5
2. Woollen fabrics	"	94.6	226.6	239.5
3. Linen fabrics (exclusive of fabrics for technical purposes and sacking)	mill. m^2	30.0	322.6	1,075.3
4. Silk fabrics	mill. m	21.6	64.0	296.3
5. Needle trades products	mill. rbls. (1932 prices)	2,291.7	4 700.0	205.1
6. Knit goods	"	619.7	2,270.0	366.3
7. Leather shoes	mill. prs.	82.0	180.0	219.5
8. Rubber shoes	"	64.8	100.0	154.3
9. Cigarettes	billions	67.4	125.0	185.5
10. Makhorka tobacco	thous. cases	3,274.1	6,000.0	183.3
11. Confectionery	thous. tons	548.0	1,350.0	246.3
12. Salt	"	2,659.0	6,000.0	225.6
13. Macaroni	"	185.4	510.0	274.9
14. Beer	thous. hl.	4,206.0	7,500.0	178.3
15. Non-alcoholic beverages	"	6,075.3	16,000.0	263.4
16. Furniture	mill. rbls. (1932 prices)	172.0	506.7	294.6
17. Metalware (total)	"	911.0	2,300.0	252.5
of which:				
By State industry:				
Metal kitchen utensils	"	38.3	150.0	391.6
Metal bedsteads	thousands	499.0	1,700.0	340.7
Sewing machines	"	328.7	450.0	136.9
Watches and clocks	mill. rbls.	20.8	100.0	480.8
Electric lamps (up to 150 w)	millions	32.3	113.0	349.8
Bicycles	thousands	128.0	575.0	447.8
Photographic apparatus	"	12.0	140.0	—
Tube radio sets	"	29.3	500.0	—
Phonographs (by State and handicraft industry)	"	57.8	1,500.0	—
Phonograph records	millions	1.7	40.0	—
18. Musical instruments:				
a) Pianos	thousands	3.8	28.0	736.8
b) String instruments	"	659.9	2,160.0	327.3
of which:				
Plucked instruments (by P. C. of Light Industry)	"	490.8	1,320.0	268.9
c) Wind instruments	"	25.0	85.0	340.0
d) Accordions	"	37.5	250.0	666.7
19. Glass and earthenware	mill. rbls. (1932 prices)	116.7	415.0	355.6
of which:				
By State industry:				
Glasses	millions	85.3	340.0	398.6
Plates	"	52.5	180.0	342.8
Cups and saucers	million sets	17.6	50.0	284.1
20. Matches	million cases	5.6	12.0	214.2
21. Soap (in terms of 40% fatty matter)	thous. tons	357.2	1,000.0	280.0
22. Fancy articles	mill. rbls. (1932 prices)	490.4	1,365.0	278.3

Table 3

COMMODITY OUTPUT, NON-MARKET CONSUMPTION, AND MARKET RESOURCES OF MANUFACTURED COMMODITIES OF GENERAL CONSUMPTION

(in million rubles, in wholesale industrial prices of 1932)

In lieu	Commodity output			Non-market resources			Market resources			Market resources in % of manufactured commodity output	
	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932	1932	1937	1937 in % of 1932	1932	1937
A. State industry	14,532.0	34,220.0	235.5	3,240.5	5,262.8	162.4	11,291.5	28,957.2	256.5	77.7	84.6
of which:											
Textile group	4 995.0	11,300.0	226.2	2,518.4	4,200.0	166.8	2,476.6	7,100.0	286.7	49.6	62.8
Ready-made clothing	2,046.5	5,275.0	257.8	121.5	161.0	132.5	1,925.0	5,114.0	265.7	94.1	96.9
Footwear	1,292.7	2,619.3	202.6	100.2	125.3	125.0	1,192.5	2,494.0	209.1	92.2	95.2
Food group (exclusive of the main foodstuffs)	2,015.1	5 330.0	264.5	86.8	147.5	169.9	1,928.3	5,182.5	268.8	95.7	97.2
Household articles	606.3	1,631.5	269.1	220.0	363.0	165.0	386.3	1,268.5	328.4	63.7	77.8
Cigarettes, makhorka tobacco and matches	1,564.8	3,156.0	201.7	20.9	57.8	276.6	1,543.9	3,098.2	200.7	98.7	98.2
Soap and perfumery	328.8	903.2	274.7	11.1	18.0	162.2	317.7	885.2	278.6	96.6	98.0
Fancy articles	222.3	785.0	353.1	46.5	80.0	172.0	175.8	705.0	401.2	79.1	89.8
Articles for culture and sports	184.0	1,049.5	570.4	38.3	70.2	183.3	145.7	979.3	672.1	79.2	93.3
Miscellaneous	1,276.5	2,170.5	170.0	76.8	40.0	52.1	1,199.7	2,130.5	177.6	94.0	98.2
B. Handicraft industry	5,601.6	11,538.0	206.0	2,105.1	2,138.0	101.6	3,496.5	9,400.0	268.9	62.4	81.4
Total output of State and handicraft industry . . .	20,133.6	45,758.0	227.3	5,345.6	7,400.8	138.4	14,788.0	38,357.2	259.4	73.4	83.8

Note: The commodity production of State industry in the group marked "Miscellaneous" includes the lumber and kerosene intended for sale on the open market. The commodity production of handicraft industry includes the total output of the commodity-producing branches of the artisan, handicraft and invalids' co-operative organizations.

The figures for the timber co-operative organizations include the output of the wood-working industries and in the wood-chemical and timber-producing industries only the output which is intended to be sold on the open market.

Table 4

GROSS PRODUCTION, COMMODITY PRODUCTION AND STATE RECEIPTS OF GRAINS
(in million centners)

Indices	1932	1937	1937 in % of 1932
Gross amount harvested	698.7	1,048.0	150.0
Commodity production	198.55	345.0	173.8
Commodity production in % of total	28.5	32.9	—
Receipts by the State	189.38	300.0	158.4
Receipts in % of commodity production	95.4	87.0	—
Collective farm trade (including State purchases)	9.17	45.0	490.7
In % of commodity output	4.6	13.0	—

Table 5

STRUCTURE OF CENTRALIZED STATE GRAIN RESOURCES ACCORDING TO SOURCES OF SUPPLY

Indices	1932		1933		1937		1937 in % of:	
	Mill. centners	Percentage of total	Mill. centners	Percentage of total	Mill. centners	Percentage of total	1932	1933
Supplies received through contractation	153.95	81.3	—	—	—	—	—	—
Supplies received through grain delivery quotas	—	—	155.9	70.7	125.0	41.7	—	80.2
Payments in kind to machine and tractor stations	—	—	25.2	11.5	120.0	40.0	—	476.2
State farms	15.90	8.4	20.4	9.2	30.0	10.0	188.7	147.1
Mill toll, return of seed loans, etc.	19.53	10.3	19.1	8.6	25.0	8.3	128.0	130.9
Total	189.38	100.0	220.6	100.0	300.0	100.0	158.4	136.0

Table 6

STATE PROCUREMENTS OF INDUSTRIAL CROPS

Crops	Units of measurement	1932			1937			Gross amounts harvested in 1937 in % of 1932	State procurements in 1937 in % of 1932
		Gross amounts harvested	State procurements	State procurements in % of gross amounts harvested	Gross amounts harvested	State procurements	State procurements in % of gross amounts harvested		
Unginned cotton	thousand tons	1,272.0	1,202.6	94.5	2,125.0	2,104.0	99.0	167.1	175.0
Cotton, in fibre equivalent	thousand tons	403.8	382.0	94.5	700.0	693.0	99.0	173.4	181.4
Flax fibre	thousand tons	502.0	287.0	57.1	806.6	645.0	80.0	160.6	224.7
Silk (cocoons)	thousand tons	—	10.2	—	26.0	25.0	96.1	—	245.0
Hemp	thousand tons	261.9	40.0	15.2	475.6	295.0	62.0	181.5	737.5
Tobacco	thousand tons	57.4	49.9	86.9	130.0	121.0	93.0	226.5	242.4
Makhorka tobacco	thousand tons	96.8	74.5	76.9	234.0	195.6	83.6	241.7	262.6
Sugar beet	mill. ctnrs.	65.6	61.1	93.1	276.0	270.0	97.8	420.7	441.8

Table 7

COMMODITY PRODUCTION OF AGRICULTURAL FOODSTUFFS

(in thousand tons)

Foodstuffs	Years	Commodity production	Of which:					
			Centralized State resources		From suburban farms		Collective farm trade (inclusive of decentralized procurements)	
			Absolute figures	In % of commodity production	Absolute figures	In % of commodity production	Absolute figures	In % of commodity production
Grain	1932	19,855	18,938	95.4	—	—	917	4.6
	1937	34,500	30,000	87.0	—	—	4,500	13.0
1937 in % of 1932		173.8	158.4	—	—	—	490.7	—
Meat	1932	935.0	680.4	72.8	31.0	3.3	223.6	23.9
	1937	2,484.0	1,334.0	53.7	247.5	10.0	902.5	36.3
1937 in % of 1932		265.7	196.1	—	798.4	—	403.6	—
Milk and dairy products in terms of milk	1932	4,088	2,100	51.4	246.0	6.0	1,742	42.6
	1937	9,637	5,841	60.6	770.0	8.0	3,026	31.4
1937 in % of 1932		235.7	278.1	—	313.0	—	173.7	—
Potatoes	1932	8,984	4,642	51.7	343.0	3.8	3,999	44.5
	1937	16,400	7,620	46.5	1,440.0	8.8	7,340	44.7
1937 in % of 1932		182.5	164.2	—	419.8	—	183.5	—
Vegetables & melons	1932	4,187	1,673	40.0	1,546	36.9	968	23.1
	1937	8,713	1,500	17.2	4,800	55.1	2,413	27.7
1937 in % of 1932		208.1	89.6	—	310.5	—	249.3	—

Table 8

REDUCTION OF RETAIL PRICES IN SOCIALIZED TRADE
(in million rubles)

Commodities	Commodity circulation in 1937						Reduction in comparison with 1933 prices					
	In average weighted prices of 1933			In planned prices of 1937			In million rubles			In percentages		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Foodstuffs	24,725	6,900	31,625	16,015	4,695	20,710	8,710	2,205	10,915	35.2	32.0	34.5
of which:												
a) Planned	9,780	3,770	13,550	6,140	2,430	8,570	3,640	1,340	4,980	37.2	35.5	36.8
b) Regulated	12,145	2,820	14,965	8,040	2,060	10,100	4,105	760	4,865	33.8	27.0	32.5
c) Handicraft	2,800	310	3,110	1,835	205	2,040	965	105	1,070	34.5	33.9	34.5
Manufactured goods for general consumption	27,925	22,025	49,950	18,675	13,635	32,310	9,250	8,390	17,640	33.1	38.1	35.3
of which:												
a) Planned	13,970	16,870	30,840	9,740	10,460	20,200	4,230	6,410	10,640	30.3	38.0	34.5
b) Regulated	7,745	3,600	11,345	4,965	2,180	7,145	2,780	1,420	4,200	35.9	39.4	37.0
c) Handicraft	6,210	1,555	7,765	3,970	995	4,965	2,240	560	2,800	36.1	36.0	36.1
Total	52,650	28,925	81,575	34,690	18,330	53,020	17,960	10,595	28,555	34.1	36.6	35.0

Table 9

STATE AND CO-OPERATIVE RETAIL TRADE SYSTEM DURING THE SECOND FIVE-YEAR PLAN PERIOD

(in thousand units)

Trading systems	Urban							Rural [1]							Total [1]						
	As of Jan. 1, 1933			As of Jan. 1, 1938			Jan. 1, 1938 in % of Jan. 1, 1933	As of Jan. 1, 1933			As of Jan. 1, 1938			Jan. 1, 1938 in % of Jan. 1, 1933	As of Jan. 1, 1933			As of Jan. 1, 1938			Jan. 1, 1938 in % of Jan. 1, 1933
	Stores	Stalls	Total	Stores	Stalls	Total		Stores	Stalls	Total	Stores	Stalls	Total		Stores	Stalls	Total	Stores	Stalls	Total	
1. Co-operative trading system	36.3	29.5	65.8	45.4	36.9	82.3	125.0	109.6	19.1	128.7	159.0	26.1	185.1	143.8	145.9	48.6	194.5	204.4	63.0	267.4	137.5
of which:																					
All-Union Co-operative Association [2]	33.2	14.6	47.8	41.5	17.9	59.4	124.3	105.4	14.9	120.3	150.0	21.0	171.0	142.1	138.6	29.5	168.1	191.5	38.9	230.4	137.0
2. State trading system (exclusive of Workers' Supply Depts.)	15.6	15.4	31.0	27.4	23.4	50.8	163.9	24.8	7.1	31.9	31.8	7.6	39.4	123.5	40.4	22.5	62.9	59.2	31.0	90.2	143.4
of which:																					
State trade ass'ns and retail trade ass'ns of the P.C. of Supply	6.7	4.8	11.5	14.0	7.0	21.0	182.6	9.4	2.2	11.6	12.0	2.8	14.8	127.6	16.1	7.0	23.1	26.0	9.8	35.8	155.0
3. Workers' Supply Departments of P.C. of Heavy Industry, of Light Industry, of Transportation and other P.C.s. .	11.3	7.9	19.2	14.7	10.3	25.0	130.2	8.7	3.9	12.6	10.4	4.7	15.1	119.8	20.0	11.8	31.8	25.1	15.0	40.1	126.1
4. Miscellaneous socialized trade . . .	1.7	2.8	4.5	2.0	3.2	5.2	115.6	0.9	1.0	1.9	1.0	1.1	2.1	110.5	2.6	3.8	6.4	3.0	4.3	7.3	114.1
Total	64.9	55.6	120.5	89.5	73.8	163.3	135.5	144.0	31.1	175.1	202.2	39.5	241.7	138.0	208.9	86.7	295.6	291.7	113.3	405.0	137.0

[1] Exclusive of stationary collective farm stores and stalls.

[2] Exclusive of the timber, transportation and peat sections, the stores and stalls of which are included in the Workers' Supply Departments.

Table 10

PUBLIC CATERING

Indices	1932	1937	1937 in % of 1932
I. Number of urban and rural workers and other toilers included in the public catering system (total in thousands)	21,000	52,500	250.0
of which:			
a) Urban State and co-operative dining rooms	13,100	27,600	210.7
b) Urban dining rooms opened on independent initiative	1,000	2,000	200.0
c) Rural State and co-operative dining rooms	2,400	6,600	275.0
d) Collective farm dining rooms opened on independent initiative	4,500	16,300	362.2
II. Annual output of State and co-operative dining rooms (total in million dishes)	9,700	25,150	259.3
of which:			
a) Urban	8,000	20,650	258.1
b) Rural	1,700	4,500	264.7
III. Number of dishes served per day per person, total	2.21	2.59	117.2
of which:			
a) Urban	2.12	2.50	117.9
b) Rural	2.7	3.0	111.1
IV. Turnover of State and co-operative dining rooms (total in prices of 1932, in million rubles)	4,800	12,700	264.6
of which:			
a) Urban	4,175	11,040	264.4
b) Rural	625	1,660	265.6

X. HOUSING AND MUNICIPAL SERVICE *Table 1*

URBAN HOUSING

Indices	Units of measurement	1932	1937	1937 in % of 1932
Housing space made available for occupancy	thous. m^2	7,500	19,675	262.3
Total available housing space as of end of year, allowing for space discarded	„	185,060	246,456	133.2
Urban population as of end of year	mill. persons	39.7	46.1	116.1
Average housing space per person, as of end of year	m^2	4.66	5.35	114.8

Note: During the five years a total space of 69,588,000 sq. metres will be opened for occupancy, inclusive of 3,770,000 sq. metres for trading premises.

Table 2

HOUSING CONDITIONS OF THE TOILERS IN THE PRINCIPAL BRANCHES OF INDUSTRY UNDER THE P. C. OF HEAVY INDUSTRY AND THE TRANSPORTATION SYSTEM

Branches of industry and transportation	1932		1937		Total new construction for the five years, in thousand sq. metres	Total capital investment in housing construction for the five years, in million rubles	1937 in % of 1932	
	Total housing space, in thousand sq. metres	Average housing space allowance per person, in sq. metres	Total available housing space, in thousand sq. metres allowing for space discarded	Average housing space allowance per person, in sq. metres			Available housing space	Average housing space allowance
Coal	5,221.0	3.5	10,419.5	7.0	5,458.5	1,015.7	199.5	200.0
Iron and steel . . .	2,390.0	4.5	8,429.0	6.0	6,111.0	1,100.0	352.7	133.3
Machinery production	1,800.0	4.9	9,422.0	6.0	7,676.0	1,420.0	523.4	122.4
P. C. of Transportation	6,605.0	5.9	12,351.0	6.0	5,946.0	1,100.0	186.9	101.7
P. C. of Waterway Transportation . .	902.4	3.7	1,680.7	4.8	823.5	140.0[1]	186.2	129.7

[1] Exclusive of investments in irrigation and water power construction.

Table 3

MUNICIPAL SERVICE
(indices of operation)

Indices	As of Jan. 1, 1933	As of Jan. 1, 1938
I. Water Supply Systems		
Number of cities provided with water supply systems	366	440
Population of these cities (millions)	26.2	37.5
Number of houses supplied with running water (thous.)	175.5	275.0
Street water mains (thousand km.)	10.6	16.4
Daily capacity of water-works (thousand cu. metres)	2,086.0	4,500.0
Average daily water supply (thousand cu. metres)	1,654.0	3,600.0
Total water consumption per person (litres)	63.0	95.0
II. Sewage Systems		
Number of cities supplied with sewage systems	55	125
Population of these cities (millions)	15.5	28.0
Number of houses equipped with drain-pipes (thousands)	59.0	128.0
Street sewer network (thousand km.)	3.2	7.4
III. Laundries		
Number of municipal laundries	65	700
Installed capacity (kg. per 7 hour shift)	77,906	713,442
Increase in capacity (kg. for the five years)	—	635,536
Capacity per annum, with two shifts working, reduced to a common basis (tons)	46,700	428,200
Average quantity of washing per inhabitant per annum (kg.)	1.2	9.8
Percentage of population served, the average quota being 72 kg. of washing per inhabitant per annum	1.6	13.0
IV. Public Baths		
Number of municipal baths	1,171	2,634
Number of bathing accommodations in public baths (thousands)	140.7	297.0
of which:		
Newly erected baths	—	1,552
Number of bathing accommodations in new baths (thousands)	—	155.0
Total capacity per annum (thousands)	422,150	887,700
V. Street Cars		
Number of cities having street cars	50	70
Population of these cities (thousands)	16,200	23,500
Number of passengers (millions)	5,000	8,000
VI. Municipal Electric Power Stations		
Installed capacity (thousand kw.)	254.9	600.0
Output of electric power (million kwh.)	709.3	1,600.0

Note: The indices do not include enterprises controlled by industrial establishments.

XI. PUBLIC HEALTH

Table 1

PRINCIPAL INDICES OF THE PUBLIC HEALTH SERVICE OF THE U.S.S.R.

Indices	1932	1937	1937 in % of 1932
Number of hospital beds per thousand of urban population (taking into account urban hospital beds used by the agricultural population)	5.38	7.0	130.1
Absolute number of urban hospital beds (thousands) [1]	230.0	331.0	143.9
Number of hospital beds per thousand of rural population (taking into account urban hospital beds made available for rural population)	1.23	1.9	154.5
Absolute number of hospital beds in rural places (thousands)	107.0	212.0	198.1
Number of out-patient visits per urban inhabitant per annum (allowing for the use of urban institutions by the agricultural population)	8.45	12.0	142.0
Number of medical stations (thousands)	6.5	9.7	149.2
Percentage of children of female workers in the key industries accommodated in crèches	60.0	100.0	166.7
Absolute number of places in urban crèches (thousands) [2]	273.8	720.0	263.0
Absolute number of places in permanent rural crèches (thousands)	350.2	800.0	228.4
Number of places in seasonal rural crèches (thousands)	3,920.3	9,000.0	229.6
Percentage of insured persons accommodated in health resorts and sanatoriums	1.78	3.0	168.5
Absolute number of health resort and sanatorium beds (thousands)	66.4	110.2	166.0
Number of health resort patients (thousands) [3]	736.0	1,356.0	184.2
Number of persons accommodated at rest homes through the All-Union Central Council of Trade Unions (per thousand insured persons, exclusive of children's rest homes)	40.3	75.0	186.1
Absolute number of beds in the rest homes under the All-Union Central Council of Trade Unions (thousands)	72.0	113.0	156.9
Absolute number of persons accommodated in A.U.C.C.T.U. rest homes (thousands)	914.0	2,034.0	222.5
Number of persons practising physical culture (millions)	4.7	25.0	531.9
Number of physicians (thousands)	76.3	97.0	127.1

[1] Exclusive of beds in psychiatric hospitals, hospitals in the system of the P.C. of Transportation, prophylactic sanatoriums and auxiliary hospitals.

[2] Inclusive of railway transportation system.

[3] Exclusive of accommodations in sanatoriums not on premises of health resorts.

XII. EDUCATION

Table 1

MASS EDUCATIONAL INSTITUTIONS AND STUDENT QUOTAS

Indices	Units of measurement	1932			1933	1934	1935	1936	1937			1937 in % of 1932		
		Total	Of which						Total	Of which		Total	Of which	
			Urban	Rural						Urban	Rural		Urban	Rural
I. Social Education														
Pupils in elementary and middle schools	thous.	21,714[1]	4,880	16,834	21,367	26,662	28,107	28,822	29,929	6,815	23,114	137.8	139.7	137.3
of which:														
1st to 4th classes[2]	"	18,080	3,458	14,622	19,164	19,671	19,777	18,879[3]	18,294[3]	3,466	14,828	101.2	100.2	101.4
5th to 7th classes	"	3,577	1,369	2,208	5,060	6,687	7,813	9,163	10,568	2,521	8,047	295.4	184.1	364.4
8th to 10th classes	"	57	53	4	143	304	517	780	1,067	828	239	—	—	—
Pupils in elementary and middle schools per thous. of population	pupils	131.6	122.9	134.4	—	—	—	—	165.6	147.8	171.7	125.8	120.3	127.8
Expenditure per pupil in classes 1-4	rubles	40.30	49.35	37.31	—	—	—	—	64.51	71.00	62.93	160.1	143.9	168.7
Expenditure per pupil in classes 5-7	"	113.52	125.58	103.90	—	—	—	—	173.63	182.00	170.88	153.0	144.9	164.5
Expenditure per pupil in classes 8-10	"	145.29	145.29	—	—	—	—	—	295.70	295.70	295.70	203.5	203.5	—
Pupils in pre-school institutions	thous.	5,231	1,129	4,102	5,917	7,427	9,050	11,950	16,000	2,927	13,073	305.9	259.3	318.7
of which:														
a) All year	"	1,146	726	420	1,562	2,054	2,550	2,950	3,500	1,688	1,812	305.4	232.5	431.4
b) Seasonal	"	4,085	403	3,682	4,355	5,373	6,500	9,000	12,500	1,239	11,261	306.0	307.4	305.8
Children in homes and institutions for protection of childhood	"	217	—	—	312	339	330	330	330	—	—	152.1	—	—

II. Political Education														
Persons attending schools and courses for the abolition of illiteracy . .	„	7,170	809	6,361	5,027	5,076	2,000	—	—	—	—	—	—	—
Persons attending schools and courses for the abolition of semi-literacy	„	6,471	1,686	4,785	4,814	5,747	6,800	7,900	9,000	2,100	6,900	139.1	124.6	144.2
Persons attending schools of general education or advanced courses . .	„	—	—	—	274	326	500	1,000	1,800	1,200	600	—	—	—
Clubs and related institutions (Houses of Culture, rural reading rooms, etc.) of which:	„	49.3	5.9	43.4	—	—	—	—	76.9	6.3	70.6	156.0	106.8	162.7
Trade union clubs and clubs under the P. C.s of Education	„	6.80	4.09	2.71	—	—	—	—	10.87	4.52	6.35	159.9	110.5	234.3
Libraries for mass use	„	15	—	—	16.3	17.8	19.7	22.2	25.0	—	—	166.7	—	—
Volumes in general public libraries .	„	96,000[4]	63,000	33,000	—	—	—	—	290000	—	—	302.1	—	—
Red Corners	„	99.7	9.5	90.2	105.0	147.0	217.0	318.0	489.0	35.0	454.0	490.5	368.4	503.3

[1] In addition there are 99,000 children attending special schools for those over school age.

[2] Inclusive of pupils in preparatory classes.

[3] The lower figure of the number of children attending the first four classes in 1936 and 1937 is explained by the fact that the instruction of children over age (over 12 years of age) attending these classes is being finished, and by the great decrease in the number of children repeating classes.

[4] Data incomplete.

Table 2

PRESS

Indices	1932	1933	1934	1935	1936	1937	1937 in % of 1932
Aggregate newspaper circulation per issue (million copies)	35.5	36.5	38 0	44.5	51.5	66.0	185.9
Annual newspaper circulation (billion copies) .	5.7	5.9	6.2	7.0	8.2	10.5	184.2
Output of books and periodicals (million printed sheets figuring 20 tons of paper per million printed sheets) . .	3,263.3	3,602.0	3,810.0	4,375.0	5,000.0	6,875.0	210.7

Table 3

SCIENTIFIC RESEARCH INSTITUTES

Numbers, cadres and post-graduate students	1932	1933	1934	1935	1936	1937
Institutes (All-Union and Republic)	770	637	616	622	626	628
Branch institutes (All-Union and Republic)	257	152	149	150	152	156
Scientific workers (exclusive of technical personnel, thousands)	44.1	40.0	41.0	43.0	46.0	50.0
Post-graduate students in scientific research institutions (total in thousands)	8.5	6.4	6.6	6.8	7.5	9.0

Note: The decrease *in the number of scientific* research institutes in 1933 and 1934 was the result of their rationalization and enlargement.

Table 4

ART

Indices	1932	1937	1937 in % of 1932
Total number of places of entertainment (motion picture houses, theatres, circuses, etc.)	26,950	71,500	265.3
of which:			
Urban	8,598	14,430	167.8
Rural	18,352	57,070	311.0
Total number of persons engaged in artistic pursuits (theatres, motion picture houses, circuses, etc.)	117,304	239,784	204.4
Theatres			
Total number of theatrical troupes	560	1,080	192.9
of which:			
Resident	386	552	143.0
Touring	174	528	303.4
of which:			
Touring rural districts	112	324	289.3
Motion Picture Houses			
Motion picture houses in cities	1,294	2,250	173.9
Motion picture installations in urban clubs	6,073	10,230	168.5
Travelling urban motion picture shows	556	1,000	179.9
Urban total	7,923	13,480	170.1
Rural stationary motion picture installations	5,037	20,400	405.0
Travelling rural motion picture shows	13,203	36,120	273.6
Rural total	18,240	56,520	309.9
Grand total, urban and rural (exclusive of school, Red Army installations, etc.)	26,163	70,000	267.6
Attendance at motion picture shows (millions)	666.5	3,135.0	470.4
of which:			
Urban districts	460.6	1,380.0	299.6
Rural districts	205.9	1,755.0	852.4
Annual attendance at motion picture shows per adul person	7.1	31.0	436.6

XIII. FINANCE

Table 1

FINANCIAL RESOURCES

(billion rubles)

Sources of revenue	1932		1937		During the First Five-Year Plan period		During the Second Five-Year Plan period	
	Absolute figures	In % of total	Absolute figures	In % of total	Absolute figures	In % of total	Absolute figures	In % of total
1. Accumulations of socialized economy, not allowing for lowered prices	33.8	75.8	93.7	83.1	83.6	69.6	328.0	79.9
of which:								
Profits	6.6	14.8	24.7	22.0	19.1	15.9	72.9	17.8
Turnover tax	19.6	43.5	59.4	52.7	42.3	35.2	216.1	52.6
2. Accumulations of socialized economy, allowing for lowered prices	33.8	75.8	65.1	77.4	83.6	69.6	273.0	76.8
Depreciation of fixed capital	2.0	4.5	5.9	7.0	6.3	5.3	20.2	5.7
Mobilized resources of the population	8.2	18.4	9.0	10.7	21.5	17.9	44.6	12.5
Miscellaneous revenues	0.6	1.3	4.1	4.9	8.7	7.2	17.7	5.0
Total revenue, allowing for lowered prices	44.6	100.0	84.1	100.0	120.1	100.0	355.5	100.0
Total revenue, not allowing for lowered prices	44.6	100.0	112.7	—	120.1	—	410.5	—

Table 2

ALLOCATION OF FINANCIAL RESOURCES

(billion rubles)

Items of expenditure	1932	1937	During the Second Five-Year Plan period	1937 in % of 1932	In % of total	
					1932	1937
1. Financing of national economy	30.2	46.8	221.4	155.0	67.8	60.3
of which:						
Capital investments . . .	19.2	24.0	113.9	125.0	43.0	30.9
Increase in circulating capital	4.1	5.5	28.2	134.0	9.1	7.1
2. Financing of social and cultural measures (exclusive of the resources of economic bodies) .	9.5	20.2	75.4	212.6	21.2	26.1
of which:						
Capital investments	0.4	1.7	5.5	425.0	0.9	2.2
3. Appropriations for administration and defence	2.5	4.3	19.0	172.0	5.6	5.5
4. Appropriations for State loan service	1.0	2.8	10.0	280.0	2.3	3.6
5. Miscellaneous appropriations .	1.4	3.5	15.7	250.0	3.1	4.5
Total appropriations	44.6	77.6	341.5	174.0	100.0	100.0
State reserve	—	6.5	14.0	—	—	—
Grand total	44.6	84.1	355.5	188.6	—	—

Table 3

PROFITS FROM SOCIALIZED ECONOMY
(billion rubles)

Branches of national economy	1937	During the Second Five-Year Plan period	1937 in % of total
Total from national economy as a whole	24.7	72.9	100.0
of which:			
Industry under P. C. of Heavy Industry[1]	3.4	9.5	13.8
Industry under P. C. of Light Industry[1]	2.7	5.9	10.9
Industry under P. C. of Timber[1]	0.1	0.2	0.4
Industry under P. C. of Supply[1]	4.9	12.5	19.8
Industry under Produce Procurement Committee of the Council of People's Commissars of the U.S.S.R.	0.5	1.8	2.0
Railway transportation	3.9	13.5	15.8
Communication	0.6	2.0	2.4
Municipal services and housing under the Executive Committees of the Soviets	2.1	8.7	8.5

[1] Inclusive of supply, sales and procurement organizations.

Table 4

PLAN FOR THE FINANCING OF SOCIAL AND CULTURAL MEASURES
(billion rubles)

(Capital investments and operating expenses, including resources of economic bodies)

Allocation of investments	1932	1937	During the Second Five-Year Plan period		1937 in % of 1932
			Absolute figures	In % of total	
Mass education	2.57	6.34	22.40	26.9	246.7
Training of cadres	3.21	6.18	24.40	29.3	192.5
Science	0.47	0.97	4.02	4.8	206.4
Art	0.08	0.25	0.89	1.1	312.5
Press	0.08	0.14	0.66	0.8	175.0
Public health and physical culture . . .	2.11	5.62	19.63	23.6	266.4
Social security and labour protection .	1.72	2.66	11.25	13.5	154.6
Total	10.24	22.16	83.25	100.0	216.4

LIST OF PERSONS WHO PARTICIPATED IN THE DRAWING UP AND ELABORATION OF THE PLAN

Workers of the State Planning Commission of the U.S.S.R. who took a leading, active part in drawing up the Second Five-Year Plan for the Development of the National Economy of the U.S.S.R.

Kuibyshev, V. V. [*Deceased*]
Mezhlauk, V. I.
Kviring, E. J.
Gaister, A. I.
Smirnov, G. I.
Troitsky, B. V.
Kraval, I. A.
Troyanovsky, A. A.
Borilin, B. S.
Almazova, J. A.
Balashev, I. N.
Barbé, A. K.
Barsukov, M. I.
Belenko, V. V.
Berdnikov, A.I.
Botner, S. O.
Burov, M. N.
Deutschmann, E. I.
Dikansky, S. S.
Friedlaender, L. M.
Gatovsky, L. M.
Ginsburg, J. S.
Kaplun, S. I.
Kogan, A. Y.
Konovalov, I. G.
Koshkaryev, A. I.
Kristin, A. I.
Lauer, H. B.
Lomov, G. I.
Malinin, A. A.
Markus, B. L.
Maximov, V. A.
Mesyatsev, P. A.
Milutin, V. P.
Morozov, I. S.
Natonek, S. D.
Nikolayev, A. M.
Ossinsky, V. V.
Parzyan, G. K.
Petropavlovsky, S. D.
Petrov, A. I.
Ratner, E. N.
Rubinstein, M. J.
Shemyatovsky, V. V.
Shutko, K. I.
Syromolotov, F. F.
Tverskoy, K. N.
Uryashzon, Y. I.
Ushakov, N. M.
Yegorov, D. Y.
Yemshanov, A. I.
Zarzar, V. A. [*Deceased*]
Zhuravitsky, I. D.
Zhurid, P. G.

The whole personnel of the State Planning Commission of the U.S.S.R., of the Economic Research Institute and of the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R. took part in the work of drawing up the Second Five-Year Plan for the Development of the National Economy of the U.S.S.R., with the following taking most active part:

Beskaravainaya, V. P.
Besher, R. Y.
Borissov, I. P.
Boyarsky, B. S.
Braude, A. A.
Bushuyev, M. M.
Butuzova, Y. V.
Byelykh, P. I.
Bykhover, L. A.
Chadayev, Y. Y.
Danilov, S. K.
Eisensohn, S. M.
Eventov, L. Y.
Epstein, I. L.
Fischsohn, A. G.
Golovin, A. P.
Gorelik, J. G.
Heinmann, S. A.
Hurwich, L. I.
Javadov, N. Y.
Jugenburg, S. M.
Karelin, M. N.
Katz, V. J.
Khojayev, T. J.
Kikin, B. I.
Klyevtsov, P. A.
Kolesinsky, V. A.
Konovalov, P. V.
Kovalyov, A P.
Krayev, M. A.
Kursky, A. D.
Kuznetsov, N. F.
Kuznetsov, P. V.
Lagutin, M. A.
Lebedev, P. M.
Lepeshinsky, V. V.
Levin, G. L.
Libin, J. X.
Litvin, A. B.
Lomov, F. I.
Mladyentsev, L. V.
Moskvin, V. I.
Nakhabin, I. P.
Nussinov, J. M.
Ossipov, A. A.
Ponarovsky, J. R.
Ponomarenko, E. A.
Potyayev, A. I.
Puchkov, S. G.
Rogalsky, I. I.
Shimichev, A. I.
Spencer, B. M.
Slavin, S. V.
Sokolov, V. V.
Sollertinskaya, Y. I.
Solomonov, Y. M.
Sovalov, A. A.
Sukharevsky, B. M.
Syenko, A. N.
Tikhonov, V. G.
Tretyakov, F. M.
Tsagolov, N. A.
Tsirlin, L. M.
Turetsky, S. Y.
Vyesnik, M. I.
Vinnikov, A. Y.
Vladimirov, Y. P.
Wildgrube, A. O.
Yoffe, Y. A.
Zaslavsky, A. A.
Zenkis, Y. S.
Zhuk, A. P.
Zubchenko, V. I.

The following took an active part in technically preparing this volume for press. Brukhanova, M. A.; Chadayev, Y. Y.; Petropavlovskaya, Z. P.; Popov, B. V.; Rogushina, A. A.; Shelkrut, E. M.; Sinitsyna, T. D.; Vorontsova, M. I. and Zukkermann, G. M.—Haus. V. J. was in charge of the technical editing.

Specialists and scientists who took an active part in the study and elaboration of the most important technical and economic problems of the Second Five-Year Plan for the Development of the National Economy of the U.S.S.R.

Professor Akhutin, A. N.
Academician Alexandrov, I. G.
Academician Arkhangelsky, A. D.
Professor Arkhangelsky, V. I.
Academician Baikov, A. A.
Professor Baumgard, V. S.
Academician Britzke, E. V.
Professor Budnikov, P. P.
Professor Byelov, P. S.
Academician Chaplygin, A. B.
Professor Chekin, P. A.
Professor Chernov, A. A.
Academician Chernyshev, A. A.
Professor Dolgov, A. N.
Professor Dudnikov, V. T. *[Deceased]*
Academician Fersman, A. N.
Professor Friedmann, A. I.
Professor Geniyev, N. N.
Academician Glushkov, V. G.
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Professor Jung, V. N.
Professor Kazakov, A. V.
Academician Keller, B. A.
Professor Kostyakov, A. N.
Academician Kurnakov, N. F.
Professor Lebyedyantsev, A. K.
Professor Loleit, A. F. *[Deceased]*
Professor Maltsev, A. M.
Professor Nagibin, Y. D.
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Academician Obruchov, V. A.
Professor Oppenheim, K. A.
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Academician Pavlov, M. A.
Academician Pavlovsky, N. N.
Academician Pryanishnikov, D. N.
Professor Richter, A. I.
Professor Samoilovich, R. F.
Professor Schmidt, O. J.
Professor Shulgin, E. Y.
Academician Tulaikov, N. M.
Academician Vavilov, N. I.
Academician Vedyeneyev, B. E.
Academician Vernadsky, V. I.
Engineer Vesselago, G. S.
Academician Williams, V. R.
Academician Yoffe, A. F.
Professor Yushkevich, N. F.
Academician Zelinsky, N. D.
Professor Zhirmunsky, A. M.

Specialists and scientists who participated in the elaboration of individual problems, and in the conferences on the Second Five-Year Plan for the Development of the National Economy of the U.S.S.R. organized by the State Planning Commission of the U.S.S.R.

Engineer Abramov, A. F.—Mechanization of loading and unloading as an element in the reorganization of railroad transportation.

Engineer Abramov, J. K.—Outlook for the development of the Ural coal industry.

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Engineer Bazhanov, V. M.—Prospective development of the coal industry under the Second Five-Year Plan.

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Engineer Mark, M. G.—Receiving and transmission systems in the radio broadcasting network of the U.S.S.R. under the Second Five-Year Plan.

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Engineer Nesterov, A. T.—Combating the corrosion of chemical apparatus.

Engineer Nikshich, I. P.—1) Raw material supply base of the iron and steel and non-ferrous metals industries; 2) Manganese in the U.S.S.R.

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Schlichter, A. A.—Electrification of agriculture.

Engineer Shabarov, N. V.—Coals of Central Asia.

Prof. Shadlun, N. A. [*Deceased*]—Utilization of titano-magnetites under the Second Five-Year Plan.

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Engineer Weber (U.S.A.)—Preparatory central kitchens in the public catering system.

Engineer Wiegandt, K. P.—Projection, type fixation, standardization and normalization of construction.

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